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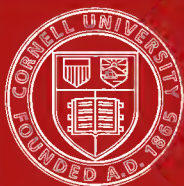
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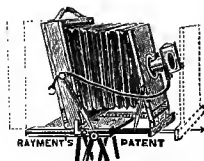
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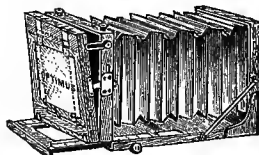


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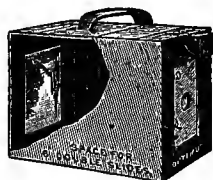


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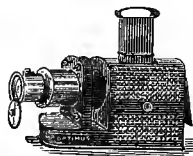
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MODERN PHOTOGRAPHY FOR AMATEURS.

BY

J. EATON FEARN.

LONDON :

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PREFACE.

THE success of "Modern Photography," which justifies the publishers in issuing this revised edition, makes the author feel proud that his unpretentious little work has found favour in the eyes of amateur Photographers ; and he only hopes that this revised edition may prove as useful to beginners as the previous issue.

J. EATON FEARN

Advertiser Office, Uttoxeter.

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MODERN PHOTOGRAPHY FOR AMATEURS.

CHAPTER I.

Fragmentary History of Photography — Advantages of Dry Plates over Wet Collodion—Expense of Photography—Choice of Apparatus—Necessary Outfit—Dark Room, &c.

History of Photography. — During the last half-century, rapid strides have been made in the useful and fascinating art-science of photography, and amateurs of to-day are reaping the fruits of the labours of many bygone experimenters.

About the second half of the sixteenth century, Baptista Porta, a deep-thinking Neapolitan, made the important discovery that the scenes outside his house were visible on the whitewashed wall of a darkened room, the image finding its way through a small hole in one of his window shutters. Thus, like many another valuable discovery, photography owed its birth

to an accident. It was not, however, till nigh on 300 years later that it occurred to anyone that it was within the bounds of human possibility to render these evanescent pictures permanent and a "joy for ever."

Amongst the first experimenters in this direction were Daguerre, the famous Parisian scene-painter, and Nicéphore Niépce, a clever mechanic living at Châlons-sur-Saône. Niépce died without discovering anything valuable, Daguerre alone achieving success; and by the introduction of what, even to this day, are known as "Daguerre-types," was laid the foundation of modern photography. Thirty years later, Scott Archer gave to the world the "wet collodion process," as it was termed, which finally paved the way for dry gelatine plates—the boon of the professional and the joy of the amateur.

Advantages of Dry Plates.—The collodion process was exceedingly messy, and the apparatus required in its manipulation expensive and extremely cumbersome. A donkey-cart was certainly to be numbered amongst the accessories requisite! With some truth was it called the "black art"; whilst its votaries were easily picked out by their stained clothes and their filthy fingers. None but the wildest enthusiast would have ventured to take up the then art of sun-made pictures as a hobby. Wet-plate photography, luckily, however, was short-lived. The introduction of dry plates soon brought a rush of enthusiastic amateurs into the photographic world. And "still they come." Dirt, stains, cumbersome apparatus, and all the old monstrosities, are at an end. A new era has arisen. To-day a lady can carry the "kit" required without the least fatigue, and numbers of the fair sex now roam at pleasure in search of the picturesque.

The aim, therefore, of the writer of this little book is to give practical elementary instruction in this delightful art. No technical phraseology, no advanced theories on debatable topics—with which most photographic manuals teem, to the great disgust and greater bewilderment of the beginner—will be indulged in. Simple instruction in simple language—such is the writer's intention.

Expense of Photography.—First, then, with regard to cost, as no one would start a new hobby without inquiring about the expense. When the outfit has been once purchased, the subsequent outlay is but trivial. A couple of sovereigns a year—or, in fact, much less—will produce a fair number of pictures. The “kit” can be purchased at almost any price. It is assumed that the reader's purse is not like the happy widow's meal-barrel and oil-cruise. If money be no object, then the fortunate possessor cannot do better than place himself in the hands of some really first-class optician and camera manufacturer. Prefer a good secondhand camera to a cheap make: plenty are offered for sale in the columns of *The Bazaar, Exchange and Mart*. Artistic pictures can, however, be secured with a good, cheap apparatus.

Choice of Apparatus.—An inexpensive set plus brains will outstrip in excellency an expensive set minus brains; for much depends upon the skill of the operator.

The following are the essentials of a good camera:

1. It should be light consistent with strength. Most cameras get ill-used in travelling or touring.

2. It should possess a bellows body, for convenience of carriage.

3. It should possess a “rising and falling front”—*i.e.*, the part which holds the lens should slide up and

down; if with a lateral motion, or "cross front," so much the better.

4. It should have a "swing-back." If what is known as a "double-swing," better still. (These terms will be explained in their proper place.)

The "tripod," which is the technical name of the legs which support the camera when set up for action, should be strong, well-made, and slide into small compass.

To be thoroughly complete, the camera should be fitted with at least three lenses:

1. A good single view lens for land- and sea-scape.
2. A rapid rectilinear doublet for portraiture, architecture, and instantaneous work.
3. A wide-angled lens for interiors and cramped positions.

If only one lens can be afforded, No. 2 should have the preference.

All modern cameras are fitted with what is called a "double dark-back." This is a perfectly light-tight case to hold two dry plates during exposure, and if the purchaser can afford to supplement it by two or three more, he will find it a great convenience.

The most important portion of the outfit is the lens. A good lens is indispensable. The camera may be a makeshift one, but, providing the lens is a perfect instrument, a good picture may be obtained. As stated above, if only one lens can be afforded at first, a rapid rectilinear doublet is the most useful. It is equally good for portraiture, instantaneous effects, architecture, landscape, copying, or enlarging. There are many good lenses in the market, but none to my mind which can compare with the "Optimus." The price is only 49s. 6d., half-plate size, and it is equal to many lenses at double the figure. It is specially suitable for shutter

or instantaneous work, is fairly wide-angled, gives splendid definition, and, considering its quality, is a marvel of cheapness. Frith's well-known series of "Life in London Streets" were all taken with the "Optimus" lens, which is capable of the highest work; and whatever camera the beginner may purchase, it will be greatly to his interest to have fitted to it an "Optimus."

Necessary Outfit.—The outfit required in addition to the "kit" mentioned above is as follows:

1. A dozen dry plates. Those known as the "Ilford" are specially to be recommended.
2. Three glass (preferable) half-plate developing-dishes.
3. Two half-plate and two quarter-plate printing-frames.
4. A packet of sensitised paper.
5. A few mounts.
6. A packet of masks and discs.
7. A toning and fixing dish.
8. A red lantern.
9. Several glass-stoppered bottles of various sizes—from 2oz. to 16oz.

Chemicals required: 1lb. alum, 1lb. hyposulphite of soda, 4oz. sulphite of soda, 1oz. meta-bisulphite of potash, 1oz. citric acid, 1oz. pyrogallic acid, 1oz. bromide of potassium, a tube of gold, $\frac{1}{4}$ lb. of borax, 2oz. of ammonia (strength .880). The above chemicals would produce a large number of pictures. It may be here stated that a negative produced costs about 3d., while a dozen prints from same, mounted, may be estimated at about 1s. 9d.

Dark Room.—The dry plates can only be opened in a dark room, with the aid of the ruby lamp. Even a

streak of white from a keyhole will work their ruin. Not until they are "fixed," which takes place after development, can they be brought into contact with white light. The double backs must be charged for exposure in this ruby light alone, and all manipulations performed in the same. The sensitised paper may be examined by gas- or candle-light, but must on no account be opened in strong, white light. The operator must, therefore, either wait till it is *perfectly* dark and work by the aid of his red lantern, or, what is much better, he must make a dark room. Most people have some little room in the house which can be spared for this purpose. All that is necessary is to tack (double thickness for safety) some ruby cloth over the window. This can be purchased very cheaply from any photographic dealer. Or what is known as "Canary Medium" will answer the same purpose, and the light (yellow) is not so trying to some eyes as red. *Every chink of white light coming into the room must be effectually stopped, or failure in all operations will be the result.* It will be found that sufficient light will filter through the red cloth or medium. If not, the red lantern must be resorted to, one fitted with a wax candle being the best.



CHAPTER II.

Portraiture — Charging Dark-back — Fixing Camera — Taking Landscape — Light and Optics — Focus of Lens — Correct Exposure, &c.

Portraiture.—Whatever coaxing baits our friends tempt us with, this must on no account be attempted at first, unless we wish to court an ignominious failure, and are desirous of being “chaffed.” To take a good portrait is the most difficult part of the art, and one which should be most certainly deferred till the tyro has produced a fair amount of passable landscape prints. Let the novice take a walk into the country with his camera for his first attempt. A barn in ruins, an ivied church, a picturesque cottage, or a simple piece of landscape with strong contrasts, will do splendidly for the “first shot.”

Charging Dark-back.—The dark-back must, of course, previously be charged with two dry plates. This must be done in the “dark room.” The film side of the plate is easily recognisable, as it has a delicate, creamy appearance. It should be carefully brushed, before being placed in the dark-slide, with a soft camel-hair brush, as often little specks of dirt get attached to the gelatine. It should not be fingered too much, as the fingers render the gelatine greasy, and the chemicals

then do not flow evenly on its surface. Place the plates in the dark-slide back to back, film outwards. Always wrap the dark-slide in a black cloth before bringing it out in the sunlight for fear a ray of sun should penetrate through a weak spot.

Fixing Camera.—To affix the camera to the tripod is a simple matter. The tripod is more manageable if one of the legs is placed in front of the manipulator. Move the legs about till the desired picture is on the ground-glass; this can only be seen by throwing the focussing cloth over the camera and your own head. Focus the object sharply, by racking the camera out. The focussing should be done without the stops, the lens being at full aperture. It will soon be discerned that when the picture is crisp and sharp in the centre, the portions at the extreme edges will be “fuzzy,” or out of focus. Judicious “stopping down” is the remedy. Then try the effect of several sized stops, commencing with the one with the greatest aperture, and the largest one that brings the whole picture into focus is the one to use.

Taking Landscape.—Having composed the picture on the ground-glass to your liking, and by the use of a stop rendered it sharp all over, the dark-back must be slid (carefully, so as not to shake the camera) into the proper groove. Next the lens must be capped, and the slide shutter drawn out. Now comes the critical moment of exposure, and here we must pause most carefully to note three matters connected therewith: (1) the intensity of the light, (2) the rapidity of the plate, and (3) the focus at which our lens is working. There are other things to be taken into consideration, such as the subject, the time of day, month, and so on; but these will be treated presently.

Light and Optics.—Just a few elementary axioms. No one possessing common sense, it might be supposed, would try to take a picture with the sun shining directly into his lens, and yet such cases are not at all rare amongst beginners; while, on the other hand, if the sun be shining straight from our backs over the camera the resulting picture will be flat and map-like, lacking those pleasing and artistic contrasts of light and shade. The sun shining obliquely on the picture is the thing to be aimed at—parts brightly illumined, parts in shadow. The light varies greatly in intensity at different times of the day and in different months of the year. From about 8 a.m. to 12 mid-day the light is strongest, and, of course, in the summer months more so than at any other time of the year.

Next, there is the rapidity of the plate to be taken into consideration. Nearly every brand of plate has a different rapidity. This is greatly to be regretted, but such is the fact. In addition to this, all manufacturers make two brands of plate—a slow and a rapid one. The slow ones should be thoroughly mastered first, and doubtless the ordinary “Ilford” is the best for the purpose. Quarter-plate size cost 1s. per dozen, and half-plate 2s. 3d. per dozen. Exposure should be experimented with on the smaller size for economy’s sake.

Focus of Lens.—This has now to be considered. If the focus of the lens is not known it must be found out; and even if the maker does give it, it is as well to test the point, as opticians are by no means infallible. In order to find the focus of a lens, focus sharply on the ground-glass some object about twenty yards distant. Then take an ordinary foot-rule, and measure very

accurately the distance between the focussing screen and the glass of the single lens. If the lens be one of rectilinear type, commonly known as a doublet, then from the ground-glass to the diaphragm or stop-slit must be measured. Now measure with very great care the diameter of each stop aperture. Next divide the focus length—*i.e.*, the length from the ground-glass to the lens—by the diameter of each stop, and the answer will be the focal value of each stop. These should be marked on the stops for future guidance. The above is not in the strict sense scientific, but answers all practical purposes.

Let us take an example to make the above still plainer. Suppose the focal length (as explained above) be 8in., and the largest stop lin. in diameter. By rule given $8 \div 1 = 8$. The value, therefore, of the stop with the lin. diameter, working with a lens of 8in. focus, will be Focus 8, or, as it is commonly expressed, $f/8$. Suppose the next smaller stop has a diameter of $\frac{1}{2}$ in. Then $8 \div \frac{1}{2} = 16$. The value of this stop will therefore be $f/16$. Now, if the beginner will grasp this elementary principle of optics, a great deal of unnecessary trouble will be avoided in the future, *viz.*, *all lenses working at one and the same focus are of the same rapidity.*

Always use the largest stop that will give sharp definition to the edges, and bear in mind the fact that *the smaller the stop used, the longer the exposure.* This is only what might be expected. To impress this fact on his mind the amateur should look at the picture on his ground-glass when the lens is worked at full aperture, or with his largest stop; then take this out, insert smallest stop, and see the difference. The stop has sharpened the picture, but cut off the light, and destroyed its previous brilliancy.

The following table will guide the tyro as to the relative exposure required with each stop:

	Times.
$f/10$	1
$f/14$	2
$f/16$	$2\frac{1}{2}$
$f/20$	4
$f/32$	10
$f/40$	16

That is to say, if the correct exposure working at $f/10$ was 1sec., it would require 2sec. at $f/14$, 4sec. at $f/20$, 16sec. at $f/40$, and so on.

If the above table does not correspond with the stops belonging to the beginner's lens, he can make one for himself. The rule is exceedingly simple. Square the focuses and compare the ratio. For example, if the correct exposure at $f/10$ be 1sec., what would be the exposure if working at $f/40$? $10^2 = 100$, $40^2 = 1600$. Answer, as 100 to 1600, or 1 to 16.

It will be at once seen that the larger the working aperture of the lens, the more rapid it is; and, of course, the shorter the focus the more rapid the lens. Some lenses possess greater "depth of focus" than others. By this is meant the power in the lens to reproduce sharply on the ground-glass objects both near and far. The smaller the stop used, the greater the depth of focus. Another type of lens is called "wide-angled"; that is to say, it is one suitable for interiors or buildings in cramped situations. This class of lens has short focal lengths. Distortion is exemplified in the case of "single lenses" when trying to take buildings: they cause straight lines to be barrel-shaped. At the same time they are the best kind to use for landscape work. For very large heads, too, they come in very useful.

Correct Exposure.—This is very difficult to arrive at; experience, and experience only, will teach the right amount. A few general principles alone can be given as a guide, and practice must do the rest. A thoughtful exposure of half-a-dozen plates in succession will accomplish a great deal in this direction. There is, however, some latitude in exposure. For instance, if three seconds be the correct exposure, no doubt anything between two and five seconds could be rendered a successful picture by a cautious manipulation. Seven factors are to be considered in arriving at correct exposure. These are: (1) light, (2) subject, (3) time of day, (4) time of year, (5) lens, (6) stop, and (7) plate.

Undoubtedly "tables of exposure" would be of immense service to the beginner, but they should be regarded as "crutches" only, which a little experience should place the tyro in a position to permanently dispense with. The best tables published are those of Mr. Platts, which may be bought through any stationer for 1s.; Messrs. Cartwright and Rattray are the publishers. The answers by these tables are simply arrived at in a second or two, and almost unerringly approximately correct, that is, as near the correct exposure as it is possible to get at by means of mechanical tables.

Meanwhile, our first picture is waiting to be exposed. It is an ordinary landscape subject, we will suppose, lit up by a mid-day June sun. Our stop is $f/40$, our plate an ordinary "Ilford." The picture has been focussed very sharply, without stop, then stop inserted in slit, and lens capped. It is as well to focus for middle distance, and then stop down till foreground and distance are both rendered sharp. The dark-back has been slid into the proper groove, the slide drawn

out, the dark-back all the time being carefully covered by the black cloth to prevent the light from penetrating any weak place, and so spoiling all our work. Now comes the critical moment of actual exposure. We wait for a minute or two till the trees are perfectly still, then we remove the cap for one second, or while we count five as quickly as possible, then replace it, push back the slide of our dark-back, remove latter from camera, wrap in black cloth, and hurry to the dark room for first attempt at development.



CHAPTER III.

Latent Image—First Lesson in Development—Formulae—Over-exposure and Under-exposure—Remedies—Fixing, &c.

Latent Image.—If the beginner will examine in his dark room the plate he has just exposed, he will doubtless be surprised to find not the slightest trace of the picture he took. The film has, apparently, undergone no change since he charged his dark-slide. But the picture is there all the same, latent it is true, and requiring searching chemicals to give the same bodily form, as it were.

Developing.—Before proceeding to develop, we must study first what we are about to do. The tyro may as well be told here that, providing the exposed plate be kept perfectly free from any trace of light, he may develop it whenever he feels so disposed. He may keep it if he likes a month or a year before converting it by chemical means into a negative. Over-exposed plates should not, however, be kept, as the light on the film has an effect even after actual exposure.

There are three essential chemicals required in the development of the latent image: (1) Pyrogallic acid (commonly called "pyro"); this costs about 1s. 6d.

per oz. (2) Bromide of potassium, or ammonia, it is immaterial which. (3) Common liquor ammonia (.880). "Pyro" is a fluffy, snow-like powder, exceedingly light, and very soluble. This chemical is poisonous, and stains the fingers. Bromide of potassium is in crystals, and is a very stable compound, keeping in solution indefinitely. Ammonia is known to everyone.

Considering that the "developing-bath" is not always of the same strength in each of these chemicals, it is best to have them all three mixed up separately. It is far more scientific and convenient, too, to have them made up in three 10 per cent. solutions; half a grain or even a tenth of a grain can then be measured with the greatest accuracy, remembering that every ten drops of each solution contains one pure grain or one minim of that particular chemical. Should different plates be experimented with, too, the bath can be varied with ease to suit the different makers' own formulæ. One thing, however, the beginner must be strongly warned against, and that is the baneful habit of flying from one system of development to another. Stick to one system till it is thoroughly mastered; then, if that does not give perfect satisfaction, try another, but not till the original one has been given at least a twelve-month's trial. None can be simpler than the one here given, and none can give better results. Should, therefore, the beginner fail with this developer, let him assuredly lay to heart this fact, namely, that the fault lies at his own door.

After a time, perhaps, "dry pyro" may be substituted with advantage for "pyro in solution," but this should be deferred. The only objection against using pyro in solution is that it will not keep at all by itself in water, and not very long with any preservative chemical

mixed with it. The remedy, however, is obvious: do not mix up too large a quantity at first, but use small quantities fresh.

Procure, therefore, three glass-stoppered bottles (yellow, non-actinic are best), and label each with the name of its contents:

TEN PER CENT. SOLUTIONS.

I.—*Pyro Solution.*

Meta-bisulphite of potash	$\frac{1}{4}$ oz.
Pyrogallie acid	$\frac{1}{4}$ oz.
Made up to $2\frac{1}{2}$ oz. water; stopper well.	

II.—*Bromide Solution.*

Bromide of potassium (or ammonium)	$\frac{1}{2}$ oz.
Made up to 5oz. water.	

III.—*Ammonia Solution.*

Liquid ammonia ('880)	$\frac{1}{2}$ oz.
Water	10oz.

Ten drops, therefore, of any of the above will contain 1gr. or 1 minim of each chemical.

Before commencing to develop make up also the following:

ALUM SOLUTION.

Alum	2oz.
Citric acid	1oz.
Water	10oz.

FIXING SOLUTION.

Hyposulphite of soda	$\frac{1}{2}$ oz.
Water	2oz.

Be extremely careful not to get a particle of hypsulphite of soda in the developing-bath, or woe will be the result. The amateur will also require in his dark room a pail of water, a jug, and a fair-sized camel-hair brush. Having mixed the above, he is now ready to

commence operations. Have the three dishes arranged thus, being the order in which they will be required :

Developing Dish.

Alum Dish.

Fixing Dish.

Do not develop too near the red light, whether it is day or artificial light. After development, or even during development, the plate may be examined by red light, of course.

Take the plate out of the double dark-back, carefully brushing any little specks of dirt off the film with the camel-hair brush. Then place it in a dish of clean water while you mix the developer. For the "Ilford" plate—the one recommended—the following is the formula: Take the developing-cup and place in it 2oz. of distilled water, next drop forty drops (4gr.) of the No. I. "Pyro solution," fifty drops (5gr.) of No. II. or "Bromide solution," and fifty drops (50 minims) of No. III. or "Ammonia solution."

Bear in mind that "pyro" gives density to the negative, that "bromide" gives half-tones and checks the action of the solution, and that "ammonia" accelerates the action of the pyro.

"Under-exposure" is known by the picture delaying in showing itself. The remedy is less pyro, less bromide, and more ammonia. In "over-exposure" the picture rushes on at once. In a case of this sort pour the developer off immediately, and make another with a larger proportion of pyro and bromide and half the quantity of ammonia.

To develop, place the plate film-side upwards in the developing-dish, and having stirred the contents in the

developing-cup with a perfectly clean glass rod, pour the same in one wave over the plate, watching closely its effect. While the plate is being developed the dish must be kept in gentle motion so that the solution may act equally all over the film. Should the image flash up instantaneously you have over-exposed your plate, and the developer must immediately be poured off and a new one mixed as previously pointed out. On the other hand, should no sign of picture appear in the course of a couple of minutes, pour the solution back in the developing-cup and add another ten drops of No. III. or "Ammonia solution." Should this have no effect add another ten or more till the picture appears. If the plate, however, has been properly exposed the picture should make its appearance with fifty drops. When most of the detail is well out, give another twenty drops; this will make the picture rapidly darken. Now take the negative out of the solution and examine it by the transmitted light of your dark lantern. A little experience will be required at first before accurately judging the correct density. The detail of the picture should be such as to be well discerned at the back of the plate. In judging density it should be borne in mind that the negative loses a little of its opacity in the fixing-bath.

The negative should now be carefully washed, by pouring water gently over the film. A good wash at the tap is the best, but unless you have this in the dark room this method cannot be resorted to. The negative should be washed for at least five minutes, and great care should be taken so as not to tear the film, which at this stage is very tender. It is next placed, film-side upwards, in the alum bath for two or three minutes: this hardens the film and also clears it.

Fixing.—The plate is again well washed and finally placed in the fixing-bath, which should be always mixed fresh for use. It must be left in this bath till all the white has disappeared from the back, which will generally be in about ten minutes.

If the above instructions have been carried out carefully, the result ought to be a fine, black negative, with all the delicate details there as though drawn by a pen.

The negative can now be brought into daylight. White light no longer has any effect on it. It will, however, require at least a good two or three hours' washing, as any trace of hyposulphite of soda left in the film will cause the negative to fade. Wash well for fifteen minutes, either under a tap or in running water, and then place in a dish of clean water for two or three hours, changing the water every half-hour. A final rinse will complete the washing. The negative should now be placed in a rack to dry. Avoid trying to forward drying by placing in the sun, or against the fire, unless you wish to see the film come off bodily.



CHAPTER IV.

*First Negative—Faulty Exposure—Frilling—Fogs—Pinholes—
Denseness in Negatives, &c.*

First Negative.—We have now produced our first negative. Whether the print from the same will be a success or the reverse entirely depends on the printing quality of our negative. The negative itself is only a means to an end. It is the type, so to speak, from which future “impressions” may be taken in any number. The quality of those impressions is altogether dependent on the quality of the “type.” Although it is perfectly true that a good printing negative in the hands of a tyro may be made to give a poor, flat print, yet a weak negative can never be made to yield a passable print, except in the hands of the professional.

On an examination of the negative it will be seen that the lights are reversed, hence the term “negative.” What is white in the finished picture is black in the negative, and *vice versâ*. The high lights of the picture should be almost opaque, the shadows almost clear glass.

Faulty Exposure.—If you over-expose your picture, and could not compensate for the error in development, that negative will be weak, flat, lacking contrast, or, what is technically called “pluck.” Impossible is it

for such a negative, especially when manipulated by a novice, to yield a pleasing print. There will be no gradations of light and shadow, but all will be one dead, map-like, weak, flat tone. In nine cases out of ten the cause is the result of either over-exposure or under-development, or most probably the two errors combined. An over-exposed plate must be developed slowly. A developer strong in "pyro" and weak in ammonia is the remedy. "Pyro," it must ever be borne in mind, gives opacity. Increase the "pyro" and you increase the density. Ammonia, on the other hand, quickens the action of the "pyro." The bromide (whether of "potassium" or "ammonium" is immaterial) retards the action of the developer—acts as a brake to the wheel as it were. It also has a clearing effect on the shadows, and gives half-tones.

If the subject itself has no great contrasts in it (for example, a piece of open landscape, without strong shadows), then the normal quantity of pyrogallic acid should be doubled and the picture developed slowly, in order to increase the contrast by chemical means. The following facts, too, should be noted: Use more water in developer for contrast; use less water to decrease contrast; or, again, if the subject is one with marked contrasts (say a white cottage against a background of dark trees), then but little pyro should be used, and the picture should be developed as quickly as possible.

Sometimes "thinness of image" is a fault lying at the door of the plate manufacturer, who, for the sake of extra profit, has coated his plates with too thin an emulsion, or one weak in silver salt. As a general thing, however, the fault may be rightly placed on the shoulders of the tyro himself. Over-exposure, therefore,

it is seen, can be greatly compensated for in development. What is required is a developer strong in "pyro" and "bromide," but weak in alkali (ammonia).

Over-exposure is an evil which, alas, with little or no warning displays itself. Should the developing solution be of normal strength the image flashes up the instant the bath is applied, the plate rapidly darkening all over. An over-exposed plate with weak developer may not appear for some time, but when it does come the half-tones follow very shortly after the high lights, the whole veiling or fogging over before its time. The instant the picture shows signs of over-exposure, the developer must at once be poured off, and the plate washed. A fresh developer should be mixed at once, containing only one-third (or even less) of ammonia, and with ten drops of a 10 per cent. solution of bromide of potassium to each ounce of developer. With very great care an over-exposed plate may be saved, and when intensified (a process to be explained later on) may give a good print.

Slow development at all times and under all circumstances is an excellent plan. By "slow" development is meant a developer containing only a portion at first of the correct quantity of ammonia to be used, the rest being added in instalments as developing proceeds. On the other hand, if the picture was under-exposed—so much so that a compensating developer could not remedy the defect—the result will be a harsh negative: that is, one which will yield a hard picture with too marked contrasts, parts in the finished print being snowy white, shadows black as soot and with no detail.

The beginner will quickly learn the behaviour of an under-exposed plate in his bath. The high lights—

especially the sky portion—will appear very faintly and for a long time nothing else will show itself. Ten drops of a 10 per cent. solution of ammonia per each ounce of developer must be added. If this has not the desired effect it must be followed in succession by another ten, and another, till the detail in the picture begins to manifest itself, then no more ammonia must be added till the picture again comes to a dead stop, refusing to proceed further. Then again the “lash” must be applied by ammonia. It must be borne in mind that too great a quantity of ammonia will be sure to fog the plate.

Little, however, can be done to remedy under-exposure. If the detail in the shadows has not been exposed for, no developer in the world will produce it. By far the best thing to do with an under-exposed plate is to smash it against the wall, for fear some day in a weak moment you should be tempted to print it—a sheer waste of valuable time and material.

As already hinted, correct exposure is the *pons asinorum* to beginners in photography. Once surmount this and the rest is easy. Procure a dozen quarter-plates and experiment methodically on some simple inanimate subject—say a tree, a cottage, an old barn, or anything of a similar character which is near at hand. Solve for once and all the problem of exposure with one lens, working for the present with one stop and one alone—say stop $f/20$. Then, that once achieved, by using the table previously given, it will be an easy matter to calculate exposure for the same or similar subjects under precisely similar circumstances when smaller or larger stops are used. The backbone of the task will be broken if exposure is mastered with a particular lens and with one stop.

Let us take an example. We will suppose it to be a June day ; time, 9 a.m. Light good, diffused, sun being partially hidden behind a cloud. Subject, a pretty cottage, with a few trees at one side, and creepers climbing up the lattice-work of the porch. Lens working at $f/20$. Give one plate one second. Then reverse the dark-back, and give a second plate two seconds ; give a third one three seconds. Be very careful not to expose one plate twice over. It is not at all a bad plan to gum a little stamp-paper on the sides of the dark-back where a plate has been exposed. The slides, too, should be numbered, and the exposures given to each registered in your note-book. Make an exposure-book for yourself, ruling columns for the following items : (1) Number of slides ; (2) Date ; (3) Time of day ; (4) Subject ; (5) Lens ; (6) Stop ; (7) Light ; (8) Brand of Plate ; (9) Exposure. Now proceed to your dark room, and develop each one separately, carefully, and most observantly. The different results will teach you far more effectively the true value of correct exposure than the studying of the best-written article on the subject. At first you will not be able to judge how far density should be pushed. Only actual experience in printing will be a safe guide in this respect. Aim at a nice clean black-and-white negative, full of detail, crisp and sharp, with moderately dense high lights and shadows almost clear glass, the rest of the picture consisting of graduated tones between the two.

Before proceeding any further with the subject of development it will be as well to treat of some of the evils to which most gelatine dry plates are liable at one time or another.

Frilling.—In very hot weather the thin coat of gelatine with which the plates are coated will often

“frill” or pucker at the sides when being manipulated in one of the chemical baths; in fact, in some very severe cases the film will peel bodily off the plate. This mostly happens while the plate is in the “fixing-bath,” though sometimes it displays a strong tendency in this direction during development, especially if the developing solution should be at all warm or strong in ammonia.

In the majority of cases manufacturers are the cause of the evil by making use of bad or unsuitable gelatine for the plates. If “frilling” occurs too frequently with any particular brand of plates the tyro should at once cease to use them, and try the plates of some other manufacturer.

Frilling invariably shows itself first at the edges of the plate, the evil gradually spreading, unless quickly stopped, till the film detaches itself entirely from the plate, when the case is perfectly hopeless. Under-exposure is a frequent cause of frilling, since more than the normal quantity of ammonia has to be used to fetch out detail and to compensate for insufficient exposure. A fixing-bath too strong in hyposulphite of soda also greatly aggravates the evil. The ordinary fixing-bath, therefore, should be diluted when a plate exhibits signs of frilling. Drying the fixed plate by strong sun or artificial heat will assuredly bring about the same dire results. The alum bath is the great preventive, and should on no account be omitted, either after development or in the final washing after fixing.

The following formula of Captain Abney's is, in most cases, a sure remedy against frilling:

Tough pyroxyline	.	.	.	.	.	6gr.
Alcohol ('820)	.	.	.	.	.	$\frac{1}{2}$ oz.
Ether ('725)	.	.	.	.	.	$\frac{1}{2}$ oz.

Apply this to the film before development; the solvents must then be washed away in a dish of clean water. When all repellent action is gone, apply the developing solution; or a small percentage of alcohol added to the developing-bath will, as a rule, prevent frilling, but the addition of this retards the action of the developer. Freshly-received plates, with a tendency to frill, will often right themselves if kept a little while, the gelatine hardening in the interval. Blisters on the film are often the precursors of frilling, and these may often be stopped by flooding the plate with methylated spirit.

Fogs.—These, innumerable as the plagues of Egypt, and almost as frightful, are “diseases” to which gelatine plates are often liable. We will treat a few of the most frequent.

General Fog.—A thin, transparent veil over the negative is what is understood by “general fog.” Often it is almost imperceptible, and in the majority of cases does not materially interfere with the printing qualities of the negative. It is attributable to one of two causes—it may have been produced by light getting to the plate before, during, or after exposure. If this be suspected, then the cause of the mischief should be discovered at once. The dark-slide and the camera should be most rigorously examined. Should these prove, after most careful investigation, perfectly light-tight, then the dark room must be looked to. Going too near the red lamp during development is a sure way of courting fog; light is sure to filter its way through the stop-slit of the lens; and even when the stop is in the lens, if it does not fit with the greatest exactness, it does not always prove impervious to a ray of sunshine bent on mischief.

A small elastic band over the stop will, however, effectually remedy this. The dark-back containing the sensitised plates should always, out of doors, be wrapped in a black cloth, and during exposure should be well covered over with the velvet focussing-cloth.

Chemical Fog.—This is due to the decomposition of the gelatine by long boiling, the products of which, coming into contact with the chemicals of the developing-bath, re-act on the silver salt, and bring about a partial reduction of them. If the plates have not seen light, and the defect is owing to the emulsion being at fault, in certain cases the evil may be remedied by soaking the plate, previous to exposure, in a solution of 3gr. of bichromate of potash to each ounce of water. The plate, after this treatment, must be well washed for an hour in running water, and then left to dry. All this, of course, must be done in the dark room.

Yellow Fog.—This comes about by using an alkaline developer, that is, simple pyro and ammonia. A slight veil, however, of this description on the negative does not affect its printing value; frequently, in fact, the reverse. It may, however, be removed by floating over the surface of the film a weak solution of hydrochloric acid—one or two drops of hydrochloric acid to each ounce of water will be about the correct strength. All traces of hyposulphite in the negative must be thoroughly eliminated by a most vigorous washing, previous to being flooded with the hydrochloric solution, as the latter acid quickly decomposes the hyposulphite, leaving a deposition of sulphur. If citric acid be used, however, in the alum solution, as previously directed, between development and fixing, hydrochloric acid need not be resorted to.

Green Fog.—Undoubtedly this is the commonest of the fogs. A plate suffering from green fog looks green in the shadows of the negative if examined by *reflected* light, although the green does not show itself by transmitted light. This evil is another one for which the manufacturers of dry plates are solely responsible. Green fog, unless a very bad case, does not very much affect the printing value of the negative. The evil never occurs when using the “Ferrous Oxalate” developer, the formula of which will be given in the next chapter.

Red Fog.—Rarely is it that plates suffer from this, an aggravation of “green fog,” and due entirely to faulty emulsion.

Pinholes.—Small pinholes in the negative are the result of dust having found its way to the film previous to development; or they may be the result of minute air-bubbles in the developer, often arising from using too small a quantity of solution to develop the plate. The dry plates should always be brushed with a small camel-hair brush before charging the dark-back, and also again on taking them out for development.

Denseness in Negatives.—This is caused by using too much “pyro,” or pushing development too far. How to reduce density, and how to strengthen weak negatives (*i.e.*, negatives minus density) will be dealt with later on.



CHAPTER V.

Developing Formulæ — Choice of Plates — Ferrous Oxalate — Beach's Developer — Paper Negatives and Films — Developing Tables, &c.

Developing Formulæ.—Although the formula given in Chapter III. is the one most strongly recommended at first, still, it will be as well to devote a short chapter to other methods which will prove of great service to the tyro as he begins “to feel his way.” One thing, however, the novice must be cautioned against, and that is the great temptation of wandering from one method of development to another, finding fault with each and understanding the use of none. The science of development should be mastered by adherence to one formula, the simpler the better; then, later on, when success has been achieved, the merits of others may be tested.

The following formula, given by Captain Abney, in his splendid treatise on photography (of the greatest service to the expert), is an excellent one, giving the very highest results, and is deservedly popular. The solutions here given will have to be made up and kept in tight-fitting stoppered bottles :

I.—PYRO SOLUTION.

Pyrogallie acid	50gr.
Sodium sulphite	150gr.
Citric acid .	10gr.
Water . .	1oz.

II.—BROMIDE SOLUTION.

Potassium bromide	50gr.
Water	1oz.

III.—AMMONIA SOLUTION.

Ammonia (880)	2dr.
Water	2½oz.

These are not exactly 10 per cent. solutions, but for all practical purposes may be regarded as such. Ten drops of No. I. (pyro solution) will contain 1gr. of pyrogallic acid; ten drops of No. II. (bromide solution) 1 minim of potassium bromide; ten drops of No. III. (ammonia solution) 1 minim of pure ammonia. Any formula, therefore, may be easily mixed by using the above solutions. Extreme care should be taken not to substitute sulph-*ate* of soda for sulph-*ite*. The sulphite should be obtained fresh, too, in small quantities, as it will not keep for photographic purposes. The purest sulphite obtainable should be bought. Commercial chemicals are always to be avoided as far as photography is concerned. The purest chemicals are those sold by photographic chemists, who understand the photographer's requirements. Sodium sulphite is a good preservative for "pyro" when pure; when otherwise, the reverse. Any solution spilled about the stopper of the bottle, and allowed to dry, is quickly transformed to sulphate; this should be carefully wiped off, as it will ruin the solution if it finds a way into it.

This developer is used in precisely the same manner as the previous one. As already pointed out, the ingredients of the developer must be varied according to circumstances. The maker's formula—unfortunately often very confusing—must be analysed, and a developer mixed up in accordance with it. An analysis of a few

of the principal manufacturers' formulæ is given at the end of the present chapter.

The reason makers differ so in their formulæ is that the requirements of the plates are so widely different. A plate calculated to give a flat negative must have extra ammonia and bromide; one likely to give a bright one should have less; one liable to fog similarly must have plenty of bromide. The formulæ, therefore, given by the manufacturers afford a fair insight into the quality of the plates; but remember that the less alkali (ammonia) given, the better.

A good formula with the above developer is the following :

Pyro	2gr.
Bromide	1 minim.
Ammonia	2 minims.

To each ounce of water.

A picture with contrast should be developed quickly : one without it slowly. As to the length of time occupied in development, the following figures will be a fair guide : Negative with contrast should begin to appear in 15sec.; development finished in 2min. to 3min. Negative of medium contrast should appear in 30sec.; finished in 5min. to 10min. Instantaneous subjects should appear in 1½min.; finished in 30min. to 45min. A copied picture appears in 1min.; finished in 25min. 4½ minims of ammonia is the normal quantity recommended to each ounce of developer. This should not be added all at once, but very cautiously, in judicious instalments, as the picture seems to require it. Many amateur photographers seem inclined to substitute carbonate of potash for ammonia, the fumes of the latter being very objectionable. Besides the ammonia loses a great percentage of its power every time the stopper

is withdrawn, thus making the strength of the solution a glorious uncertainty. If carbonate of potash is used in place of ammonia, commence with eighty drops of a 10 per cent. solution — that is, eight pure grains of carbonate of potash.

Choice of Plates.—At the money, the “Ilford” plates are excellent. The plates of Elliott and Fry are also strongly recommended. They are not so liable to bronze or show green or chemical fog as some, and frilling is almost unknown with them. They are also exceedingly rapid. For “slow” work—such as architecture or landscape on a perfectly still day—the new brand of slow “Alberts” is splendid. Elliott and Fry’s plates are three and a-half times as fast as slow “Alberts,” six times as fast as slow Wratten’s, and nearly three times as fast as “Ilford” ordinary.

Ferrous Oxalate.—With all due deference to the opinions of others, the “Ferrous Oxalate” developer, so extremely popular on the Continent, is not, to my mind, one to be recommended to the beginner in photography. A novice is sure to err in exposure, and “Ferrous Oxalate” demands most sternly correct exposure, affording but little compensation for any error made, whether of under- or over-exposure.

I content myself by simply giving the formula, as some young experimenters may be tempted to give it a trial:

I.—SATURATED OXALATE SOLUTION.

Neutral oxalate of potash	8oz.
Water	16oz.

II.—SATURATED IRON SOLUTION.

Sulphate of iron	4oz.
Water	12oz.

III.—BROMIDE SOLUTION.

Bromide of potassium	1dr.
Water	1oz.

To develop, take 1oz. of the iron solution, and pour it into 6oz. of oxalate solution, adding ten drops of the bromide solution. Be very careful to mix in this order, or decomposition will follow. With this developer the "iron" is the accelerator, and the "bromide" the restrainer. When developed, wash and fix as with other developers.

The Amidol-Hauff Developer.—For the development of negatives which have received only a very short exposure, "Amidol" will be found to possess many advantages. Bromide prints and enlargements may also be developed with the same solution. The following formulæ, recommended by the manufacturers, will be found to give satisfactory results :

CONCENTRATED STOCK SOLUTION.

Water	.	.	.	.	.	.	7oz.
Sodium sulphite crystals, pure	.	.	.	.	.	.	1½oz.
Amidol	.	.	.	.	.	.	60gr.

This may be kept for a long time in full bottles, well corked. For use, mix 1oz. of the concentrated solution with 3oz. of water, and, according to the make of the plates, add a small quantity (at most 20 drops) of potassium bromide (1:10). In this state the solution may be used four or five times successively without much loss of developing power, but it is not advisable to leave the developer standing too long, nor to prepare more of it than is necessary for the work in hand.

Celluloid Films.—These are of great value to tourists and experts, but are not recommended for beginners, as they are not quite so easy to experiment with as glass. Of course, when touring with a camera they are simply a heaven-sent boon, as the carrying about of even a small number of glass-plates on a hot day is

indeed far from a joke. The following developer is strongly recommended for films :

No. I.—SOLUTION.

Pyrrogallic acid	1oz.
Meta-bisulphite of potassium	1oz.
Water	80oz.

No. II.—SOLUTION.

Carbonate of soda (crystals)	12oz.
Water	80oz.

No. III.—SOLUTION.

Bromide of potassium	1oz.
Water	9oz.

To develop, mix equal parts of Nos. I. and II., adding 5 minims (more or less as required) of No. III. to each ounce of the mixed developer.

Developing Tables.—The following is an analysis of a few of the leading plate manufacturers' formulæ.

NAME OF PLATE.	STRENGTH IN PYRO.	BROMIDE OF AMMONIUM.	AMMONIA.
Ilford	2gr.	2½gr.	4½ minims.
Elliott and Fry's	2gr.	¼gr.	1¼ minims.
Britannia	2gr.	2gr.	4 minims.
England's	1½gr.	1gr.	2 minims.
Thomas's	1¼gr.	1¼gr.	2½ minims.
Trafalgar	1gr.	1gr.	1½ minims.
Abney and Derby	2gr.	2gr. to 4gr.	1·4 minims.
Derwent	2gr. to 3gr.	2gr.	1·3 minims.
Charterhouse	1gr. to 2gr.	3gr.	1·2 minims.



CHAPTER VI.

Intensification—Reduction—Re-touching—Varnishing.

Intensification.—It has been pointed out that the best thing to do with an under-exposed negative is to destroy it, as it is impossible for it to yield a pleasing print. An over-exposed plate, however, full of delicate detail, but with little or no density, can often be saved by the process of intensification. No better definition of this process could be given than Captain Abney's. It is this: "Any method of increasing the opacity of the developed image to the chemically active rays, either by changing its colour or rendering the deposit thicker, is technically called 'intensifying a negative,' and the agents used are called 'intensifiers.'" To intensify correctly—except in a few special cases—the density of every part of the negative must be increased proportionately.

There are many methods of intensifying negatives, to each of which some objection might reasonably be made. Experimenting photographers might do a great work by concentrating their attention on this very important branch of the art, which is far from being ideal at present. It is very questionable indeed whether a negative which has undergone intensification will stand the test of time. The two principal methods

are known as "silver intensification" and "mercury intensification." The first, however, is a very delicate operation, and unless the greatest care is exercised throughout, failure will be the inevitable result. The one recommended therefore to the beginner is the "mercury intensifier."

One great advantage of the "mercury" process is that either the negative can be intensified immediately after the final washing subsequent to "fixation," or it can be done to a negative which has been stored away some time. The negative in either case previous to treatment should be thoroughly washed, and afterwards allowed to soak for an hour or so in a vessel of water in which a little alum has been previously dissolved.

It is not generally known among amateurs that a faded negative that has once been intensified by mercury can, as a rule, be brought back to its original density by performing again the process of intensification by the same method. The following formula is to be recommended :

Bichloride of mercury	..	.	1oz.
Water	.	.	10oz.

This quantity of water will not dissolve all the mercury. The residue, however, should be allowed to remain in the bottle, and more water added as the solution decreases through unavoidable waste. After the negative has been most effectively washed, allowed to soak in the weak alum solution recommended above, and again re-washed, place in a shallow dish (film-side upwards), and pour over sufficient "mercury solution" to cover the plate. In a very few seconds the negative will bleach. When the film is perfectly white all over,

take the negative out of the bath and subject it to a thorough washing. The solution may be poured back into the bottle for future use.

Bear in mind that the permanency of the negative depends in a very great measure on the thoroughness of the washing. When this is complete the negative has to be placed in a solution of ammonia, the strength of which must be varied according to the degree of intensity aimed at. One or two drops of ammonia to each ounce of water will be sufficient for a negative requiring but *little* increase of density. *The greater the density required, the more ammonia to be used.* The negative, when placed in the ammonia solution, will at once begin to darken, and the process will be complete when all action has stopped.

The following formula of Captain Abney's is one which can be strongly recommended :

Mercuric chloride	10gr.
Potassium bromide	10gr.
Water	1oz.

It is, however, far better to dilute the above solution, even to the extent of four times its volume of water, in order that its action may not be too energetic.

When the negative is completely bleached, rinse off the mercuric solution, and wash slightly. Next immerse the negative in a mixture of equal parts of a saturated solution of sulphite of soda and water; the darkening action will then gradually and effectually take place just the same as with the ammoniac solution. When sufficient density has been gained, wash thoroughly.

If the intensified negative be now examined it will be found that the thin detail has been considerably strengthened, while the high lights have been

rendered quite opaque. Be it ever remembered, however, that "prevention is better than cure." Aim at correct exposure, and mix your developer "with brains," and then there will be no need to resort to "intensification" at all.

Reduction.—Sometimes, by an error in development, a negative may suffer from the evil of over-density, almost refusing to print in direct sunlight; or it may be that parts only here and there are too dense. If the negative be only suffering from local excess of density, a little skilful "dodging" may effectually remedy the matter.

The back of the negative should be thoroughly cleaned and varnished. When the varnish has properly set, take a sharp penknife and scrape away the varnish where the density requires to be reduced. (A negative treated in this way must never be printed in direct sunlight.) If this does not effect the purpose, make a saturated solution of red prussiate of potash. At the same time make up a fresh bath of fixing solution of hyposulphite of soda of the usual strength. Next add ten drops of the "prussiate of potash" solution to the hyposulphite bath, and place the negative in the same. This will immediately and effectively reduce the negative. Should the action of the bath cease before the negative has been sufficiently reduced, accelerate its action by adding another ten drops of the prussiate solution.

Very often, through the intensity of the light, a tiled roof of a church or other building will prove after development too dense, giving, when printed, the appearance of snow on the tiles. To remove the over-density lay the negative on an even surface; then take a piece of soft cambric, wrapping about two thicknesses

on the forefinger of the right hand, and wet with strong methylated spirit. Then rub very firmly, with a circular motion, the part too dense, till it is sufficiently reduced. The film of the negative, of course, must be thoroughly dry and not varnished. Methylated spirit, too, may be successfully used in this way to remove green fog or halation.

Re-touching.—It is not advisable for amateurs to attempt re-touching. If necessary at all, it is by far the best plan to entrust the work to a professional re-toucher, who for a nominal sum will do what is required.

Varnishing.—Should only a limited number of prints be wanted from a particular negative, varnishing is not essential. If, however, the negative is a valuable one, varnishing should by no means be omitted, as this will not only render it impervious to damp, but will at the same time prevent the delicate film from getting scratched or otherwise injured. Besides, if a negative be printed from without having been varnished, after it has been stored away some time it will become stained and bronzed from its being in previous contact with the silver paper.

In order to remove silver stains, dissolve 3gr. of pure cyanide of potassium crystals in 1oz. of methylated spirit, and apply with a soft handkerchief, as in the directions previously given to remove over-density. When all the stains have been satisfactorily removed, flood the negative so treated with some fresh methylated spirit.

To varnish a negative is by no means a difficult task. For the operation some photographic varnish and a pneumatic holder will be required. Place the

negative on the pneumatic holder and gradually warm the film in front of a clear fire, taking care not to make the negative too hot, or in all probability the film will be detached from the glass. Next pour a small pool of varnish on the centre of the film and rock it so as to send in one wave equally over the whole plate. Some little practice will be required at first to do this properly. Then pour the surplus back into the bottle, rock the plate well from side to side, finally holding by means of the pneumatic holder in front of the fire until the surface is perfectly even.



CHAPTER VII.

Printing Negatives—Cloud Effects—Vignetting—Masking.

Printing Negatives. — This is by no means so mechanical a task as some amateurs seem to think. A little time back I was highly amused by an aristocratic member of a photographic club telling me, and evidently proud of the fact, that his gardener printed his negatives. All photographers of experience know, however, that there is in printing almost an infinite scope for artistic treatment.

To print, lay the finished negative film-side upwards in the printing-frame, and place on it the prepared side of a piece of sensitised paper. A blotting-paper pad at the back will secure an even contact with the negative. The frame is then exposed to good diffused light—by no means direct sunlight—the length of exposure depending entirely upon the density of the negative and the strength of the light. With a thin negative on a suitable day a few minutes' exposure may suffice, while a very dense negative may take as many hours as the other did minutes. The picture during the stage of printing may be examined at intervals in a very weak light; but the

greatest care must be exercised so as not to alter the position of the print. It is necessary to print much darker than is finally required, as the picture will lose much of its tone during subsequent operations. No better advice, however, as to how far the picture should be printed can be given than that of Captain Abney, in his "Treatise on Photography": "The print should have the highest lights nearly white, and the shadows verging on a bronze colour before toning."

The possession of a good negative of correct density is a *sine quâ non* for the production of rich, vigorous prints. Thin, hard, chalky negatives will give poor, mealy, miserable-looking prints, and no toning-bath in the universe will impart to them the rich purple tone so exceedingly pleasing in a good photograph. Many amateurs fail to grasp this important truth, vainly imagining that their failure is due to the maker's faulty sensitised paper, the lack of virtue in the particular toning-bath employed, the impurity of the chemicals—anything and everything, in fact, rather than their own negatives. A print from a good negative will tone well with any bath, while a print from a poor one is a success with none.

When printing, it is a capital plan to place a piece of plain glass in the printing-frame for the negative to rest on; this not only secures in a very great measure the safety of the negative, but in very bright weather the print made under two thicknesses of glass is better than that where the light passes directly through the glass and film of the negative. Before placing the negative in the frame, carefully brush its film, and see also that the plain glass on the other side is perfectly clean. It should also be carefully examined by transmitted light, and any small pinholes

in the film neatly spotted out with ivory-black by means of a small camel-hair brush.

Thin negatives, showing no detail in the high lights, must be "doctored" previous to being printed. There are many ways of doing this, but perhaps the simplest of all is to damp a piece of thin tissue paper evenly with a sponge, and then paste it on the back of the negative. The negative is now held up to the light, and the "high lights" are traced out with a pencil. These are then cut out with a sharp penknife, and a trial print is taken in the shade. If it then be found that the shadows still print too deep, another thickness of tissue paper should be pasted over the other one, cutting out this time perhaps the half-tones as well as the high lights.

Unless a negative is exceedingly dense, it should by no means be exposed to the direct rays of the sun; and most prints will be all the better for having been exposed in the shade. Care should also be taken that no reflections, shadows, or stray streaks of light are cast on the negative during exposure, or unequal printing will be the result. On no account must the pictures be examined too frequently during the printing stage, or imperfect whites will be the result in the finished print. At first, too, prints should be examined only by the light of the dark room.

Cloud Effects.—No landscape photograph is complete without clouds; and very seldom is it that the amateur is successful in obtaining these at the same time as he secured his picture. Cloud negatives can be bought from the dealers, but they are seldom satisfactory. The best plan is to take one's own cloud negatives, and the amateur will do well to secure different cloud effects suitable for different styles of pictures.

In exposing for clouds use the smallest stop possessed, give a very brief exposure, and do not push development too far. After printing the landscape with the sky white, take out the negative, place the cloud negative in its place, and adjust to suit the print. Now close the back of the printing-frame, and place the black focussing-cloth across the frame so as to cover the landscape part of the photograph. Printing must be done in the shade, and the black cloth slightly shifted from time to time, so as to prevent any sharp outline from appearing between the picture and the sky. As a general rule, five or ten minutes' exposure will suffice for cloud-printing. If dark objects project into the sky they may be disregarded, as the clouds printed across them will not show. Light objects, however, must be masked.

Those who are skilful with the brush might paint clouds on the negative itself with water-colours. Some painstaking amateurs produce very good imitation of clouds by judiciously laying little tufts of cotton-wool on the sky portion of the negative during the printing of the landscape. The "real thing," however, is by far the more satisfactory.

Vignetting.—Everyone admires a delicate vignette. The simplest method of obtaining one is by using vignetting papers or glasses. These can be bought through the dealers, with various-sized apertures to suit different pictures. It is by no means a bad plan to make a groove outside the printing-frame in which the vignetting-glass can slide, in order to adjust the opening to the picture. Better effect also is thus attained than by placing the vignetting-glass in the printing-frame, with the negative on the top of it. The thing to be aimed at is delicate gradation of tone.

A better way than the above, is to get from a grocer a piece of tea-lead the exact size of the printing-frame, and cut out an oval the shape of, but rather smaller than, the oval required. Next turn up the edges of the oval, and place a piece of tissue paper over the opening. Adjust to a nicety on the outside of the printing-frame, and expose face upwards to the sky. Vignette printing must not, on any account, be done in strong light, or delicacy of tone, the charm of the vignette, will never be secured. Bear in mind that the softness of the vignette depends upon the distance between the lead and the negative; the greater the distance the broader the portions through which there is shading off. The oval of the picture, to be truly artistic, should be irregular, and not give one the idea of mathematical exactness, as though a pair of compasses had been brought into requisition.

Masking.—Very often a picture may be considerably improved artistically by masking out a portion of the foreground. What are sold as the “Crown masks and discs” are excellent for this purpose. A shilling packet contains quite a large collection of masks of various-sized apertures.



CHAPTER VIII.

Toning—Fixing—Toning Formulæ.

Toning.—We have now arrived at a very fascinating operation, namely, the toning of the pictures. Many a one must often have been forcibly struck by the great variety of tones displayed in a collection of photographs. Very often the tone of a picture indicates it to be the work of a true artist, as emphatically as the composition and the lighting.

The pictures, previous to being toned, should be kept between the leaves of a book and shut up in a drawer. It is not absolutely necessary to tone them the same day as they are printed, but they should not be kept more than two or three days previous to doing so, or else they will lose somewhat in brilliancy and the purity of the high lights.

It is by far the best plan to trim the prints to the desired shapes before toning, and in this operation there is great scope for artistic treatment. To trim a print, lay it face upwards on a sheet of glass or zinc, place over it a glass-cutting shape (which can be procured in many sizes and shapes from any photographic dealer) and trim with a pair of scissors, or better still, a good sharp knife—those shoemakers use for trimming their boots are just the thing; one that has been considerably worn will be the best. The

trimming of the prints should be done at night, by gas-light, as they are exceedingly sensitive, even to the weakest daylight.

The prints, after being trimmed, must be subjected to a thorough washing; this is to eliminate all the unused soluble nitrate of silver still remaining in them. Perhaps the best plan of washing prints is to place them face downwards in a vessel of water, keeping them in gentle motion, to prevent sticking together. By no means handle them more than necessary, as every finger-mark will show in the finished print.

After the prints have remained in the water about ten or fifteen minutes, it will be perceived that the water has become quite milky. The fact is, the liberated nitrate of silver has formed chloride and carbonate of silver with the salts of lime in the water. The water should now be changed, and the prints slightly rinsed and put back again into clean water. This should be repeated three or four times, when the washing will be complete, and the prints will be ready for toning, the formulæ for which are given at the end of the present chapter.

Nothing is simpler than to change the colour of the prints, which, after having been washed, is of a disagreeable foxy-red colour; but to tone a picture to the exact colour an amateur requires is not such an easy task. Practical personal experience in this, as in many other matters, is the only true teacher.

The prints should be toned face downwards. Do not put too many in the bath at first; place them in carefully, one by one, first face downwards, then turned face up, and finally down again; this will cause the solution to act evenly on the print. Turn

the prints over by the corners to avoid finger-stains ; take care, too, that the prints do not stick together in the toning-bath, or unsightly stains will appear in the finished picture. To prevent unequal toning, the prints should be kept in constant motion.

The principal ingredient in all the toning-baths is chloride of gold. This is purchased in small sealed tubes containing 15gr. each. The tube should be broken through the centre and its contents made up into a solution of 15dr. It will keep almost indefinitely in this form, and if a grain is required at any time all that will be necessary will be to take a drachm of the solution.

The difficulty of toning is to know when to take a print out of the bath. The prints will begin to change colour almost at once, and a rich purple tone should be aimed at. Some of the ready-sensitised papers, however, will not stand being pushed to this stage, the finished result being unsatisfactory. The colour of the prints must be examined by reflected light, and it is strongly advisable to remove them from the toning-bath whilst they are still of a very warm brown in the shadows. The half-tones should be carefully watched, and when these have changed to purple the print should be taken out.

In very cold weather the toning-bath will act far more energetically if slightly warmed. Hard prints require a vigorous toning-bath—that is to say, a solution strong in chloride of gold — while weak ones should be toned in a less energetic bath.

As soon as a print is toned, place it face downwards in a clean dish of water in which a very small quantity of salt has been previously dissolved ; this latter is to stop any further toning.

Fixing.—When all the prints have been toned they should be thoroughly washed previous to being fixed. On no account have any fixing solution about whilst the prints are being toned, since the smallest particle of hyposulphite of soda will spoil any toning solution.

The following is the fixing solution :

Hyposulphite of soda	4oz.
Water	1 pint.
Ammonia ('880)	1dr.

The ammonia checks the possibility of an acid re-action, and also prevents blisters on the prints. Do not fix too many prints at once, keep the bath well in motion, and see that the prints do not stick together. In summer they will fix properly in ten minutes, and in winter in fifteen.

After being fixed, the prints must be thoroughly washed : on this entirely depends their permanence. Every atom of hyposulphite of soda left in them must be got rid of, or assuredly its presence will cause the pictures to fade. A twelve hours' wash in running water will be none too much. If this is not convenient, they must be subjected to frequent changes, and finally left to soak for twenty-four hours in a large vessel of water. A rinse after taking them out will complete the wash.

Toning Formulæ.—All the toning baths given can be thoroughly recommended.

BORAX BATH.—*For Warm Brown Tones.*

Borax	100gr.
Water	10oz.
Chloride of gold	1gr.
Water	10oz.

Mix. This bath will not keep, and should only be prepared as required, and then thrown away. 1gr. of

gold is sufficient to tone one sheet of paper. The borax bath will suit all the ready-sensitised papers in the market. Use powdered borax, and dissolve it in hot water. Afterwards make up to 10oz. Next add 1gr. of chloride of gold, or 1dr. of gold solution, to 10oz. of water, and then mix the two solutions.

CARBONATE OF SODA BATH.

Chloride of gold	1gr.
Carbonate of soda	10gr.
Water	10oz.

This bath also must be used immediately after mixing, since the gold is precipitated by the carbonate. The tones given are purple and black. The prints should be toned to dark brown for the purple tone, and to slightly blue for the black tone.

ACETATE OF SODA BATH.

Acetate of soda	30gr.
Chloride of gold	1gr.
Water	10oz.

This is an excellent bath and will keep indefinitely. It should be mixed fully a week previous to its being used. This bath produces a purple or brown tone, according to the length of time the print is immersed in it. When the bath is exhausted, add more gold and acetate of soda.

ACETATE AND BICARBONATE BATH.

Acetate of soda	120gr.
Bicarbonate of soda	10gr.
Chloride of gold	4gr.
Water	20oz.

Make up fully twenty-four hours previously to its being required. The bath keeps indefinitely, and gives rich, warm brown tones. The prints for this bath should be printed deep. The toning will be complete when all the red has disappeared from the prints,

except in the shadows, when examined by reflected light.

PHOSPHATE OF SODA BATH.

Chloride of gold	1gr.
Phosphate of soda	20gr.
Water	8oz.

This bath gives tones of a deep purple nature. It must be used soon after preparation, as the solution will not keep.

CHLORIDE OF LIME BATH.

Precipitate of chalk	20gr.
Saturated solution of chloride of lime .	2 drops
Boiling water	16oz.

When the above solution is quite cold add—

Chloride of gold	2gr.
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The above bath keeps indefinitely, and gives brilliant black-and-white tones. It is best mixed up the day previous to its requirement.

TONING AND FIXING SOLUTION IN ONE BATH.

Phosphate of soda	15gr.
Sulphocyanide of ammonium	25gr.
Hyposulphite of soda	240gr.
Water	2oz.

Next dissolve in a small quantity of water and add to the above solution—

Chloride of gold	1gr.
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It is an excellent plan for a beginner to cut a half-plate picture into four pieces, numbering them respectively at the back—one, two, three, and four—and giving to each a varied length of time in the toning-bath. Then, with particulars, these should be pasted in his note-book for future reference. The exact tone required at any time can be obtained by consulting the slips and noting the length of time each part was in the toning-bath.

CHAPTER IX.

*Mounting—Burnishing—Printing Failures—Toning Failures—
Fixing Failures.*

Mounting.—The prints, after the final washing, should not be allowed to dry before being mounted, as they mount much better in a damp state. Superfluous water should be removed from the prints by placing them between clean, pure blotting-paper. There are various methods of mounting, but nothing is better than starch for the purpose. One great cause of so many photographs fading is the use of an unsuitable mountant. If starch or paste be used it should be certainly made as it is required, as any acidity in it, arising from its having been some time mixed up, is a sure cause of fading. To make starch paste, put a little starch into a basin and make into a stiff paste with *cold* water. Next pour boiling water over it, stirring well all the time, until after it has thinned it has again stiffened; afterwards thin to the requisite consistency with hot water.

To mount, lay the print face downwards on a clean piece of plate-glass, and, by the aid of a suitable brush, paint the paste evenly over its surface. Remove all

hairs which may detach themselves from the brush, or any minute particles of undissolved starch, and then put the print in its position on the card. Next place over it a clear piece of paper—if with enamelled surface the better—and with the hand, or an indiarubber squeegee, rub the picture one way with a gentle motion, which will quickly remove all creases and superfluous paste. When this is done, slightly bend the mount back, in order to counteract the contraction of the picture in drying.

Dextrine for mounting a few pictures in a hurry is a capital mountant, as any small quantity can be immediately dissolved with warm water in an egg-cup. Here also is another good mountant: Dissolve 1oz. of hard gelatine in 15oz. of water. When melted, add 5oz. of methylated spirit.

One more mountant, which has the strong recommendation that it does not cause the prints to cockle, is :

Nelson's No. 1 Photographic Gelatine	4oz.
Water	16oz.
Glycerine	1oz.
Methylated alcohol	5oz.

First dissolve the gelatine in the water, then add the glycerine, and lastly the spirit.

Marion's Mounting Solution can be strongly recommended. It is all the better, however, for use if diluted somewhat with methylated spirit. Wolff's Patent Mounts, to be obtained from Mr. Harold Senier, chemist, 88, Norwood Road, S.E., are a wonderful invention. To mount a photograph all that is necessary is to slightly damp a print—if it has been allowed to dry—adjust it on the mount, lay a piece of note-paper over it, and rub it into contact with the card by

the hand. Undoubtedly, by the use of these cards mounting prints becomes a positive pleasure.

Burnishing.—All that remains now to be done to the prints is to pass them through a rolling or burnishing machine. Most professionals, for a trifling sum, will burnish amateurs' prints. If the amateur, however, decides to possess a burnisher himself, he will find the one sold by the name of the "Windsor" as cheap as any. A splendid gloss is given to prints by squeegeeing them on to a piece of talced glass, and peeling them off when perfectly dry.

Printing Failures.—White specks on the print are caused by the presence of dust between the film of the negative and the sensitised paper during printing. The remedy is obvious: brush the negative before printing. Double outlines in the print are the result of its having been moved during examination in the printing-frame. Blurring is the result of an unequal pressure at the back of the frame.

Toning Failures.—Uneven toning is the result of the prints having stuck together in the toning-bath. If the bath be too vigorous—the result of there being too much chloride of gold in the solution—the prints will be mealy. If the toning-bath refuses to work properly, either it requires to be rendered alkaline, or else all the gold is exhausted and more must be added to the bath; or it may be that a particle of hyposulphite of soda has found its way into the bath and contaminated it. In cold weather the toning-bath must be made milk-warm.

Fixing Failures.—Yellow spots dotted here and there on the print are the result of imperfect fixation, probably caused by the prints not having been kept in motion during fixing. Unsightly finger-marks are

caused by injudiciously handling the prints in the toning-bath. Cloudiness and a yellow hue point to insufficient time in the fixing-bath. Blisters on the print may be caused by the bath being too strong in hyposulphite of soda. Remedy : make weaker, and render alkaline by the addition of a very small quantity of ammonia to the bath.



CHAPTER X.

Instantaneous Photography—Lens for Instantaneous Work—Focus of Lens—Choice of Shutters—Selection of Plates—Taking Instantaneous Photographs—Development of Instantaneous Work—Useful Hints.

Instantaneous Photography. — There is no branch of photography more attractive than that known as “instantaneous photography,” for it presents to us objects in their most interesting aspect, and at the same time affords an immense diversity of subject, as well as considerable excitement in “shooting” our object at the correct moment. Instantaneous work requires more quietness and skill in arranging the composition, more judgment in the exposure and lighting, and more care in development, than ordinary photography. Marine views are usually selected, being the most suitable and attractive, so my remarks will refer principally to this particular branch of the art.

Lens for Instantaneous Work. — It is a common delusion to suppose that a Rapid Rectilinear is the only kind suitable for instantaneous work, for other factors besides rapidity have to be taken into account. The first essential in a lens for instantaneous work is “flatness of field,” namely, the power of covering to the edges

of the plate with as little loss of definition as possible. This will enable you to take two or more objects in your picture which are separated, or one large object, such as a steamer, extending over a considerable area of your plate. The next essential in your lens is "depth of focus," so that you can take in a near object and one more distant, and yet have both in focus. Both of these essential qualifications are possessed by most single lenses to a greater extent than by doublets. The single lenses of Dallmeyer and Suter are exceedingly suitable for this class of work.

Focus of Lens.—The next point to be considered is the focus of the lens. As a general rule, it is extremely difficult to get anything like near to marine objects, so that the lens of a half-plate camera ought to possess at least a 13in. focus.

Choice of Shutters.—Avoid shutters with elastic bands. Shutters that rise and fall, though very good for objects requiring comparatively long exposures, are altogether too slow for general use. The best shutter ever invented is the simple drop kind, with the aperture of the drop curved conversely, and with a piece of cardboard or other contrivance introduced so as to reduce or enlarge the aperture according as the light requires. It will be found more desirable, when stopping down becomes necessary in strong light, to stop by reducing the aperture of the shutter, and not by the use of a smaller diaphragm.

The aperture of my drop shutter in the month of June, in sunlight, for a 13in. focus lens, was $\frac{3}{16}$ in. in the centre of the drop, and $\frac{5}{8}$ in. at the sides, which, I think, left the intensity of the working aperture about $f/20$. The aperture, of course, must be increased when working late in the day, or in other months than June,

or in bad light, or for other than marine subjects. I always have the largest aperture of my single lenses made $f/12$, which I find gives perfect definition, and is useful when the light is weak.

Shutters constructed on the "focal-plane" principle are the most scientific and the most satisfactory for taking extremely rapid objects, as they give a graduated exposure and pass a larger percentage of light than any other form.

Selection of Plates.—With regard to the plates, they must, of course, be the most rapid in the market, such as the "rapid series" of Paget, Wratten, Elliott and Fry, or Edwards. The cheap makers have no really reliable rapid plates, and if I were using a "cheap rapid" I should increase the aperture of the shutter: they are not only slower than the dearer plates, but will not bear the same treatment in developing which the others will stand.

Taking Instantaneous Photographs.—A view meter or finder is almost a necessity in instantaneous work; though some amateurs are clever enough to sight their object between the two corners of the back frame of the camera over the shutter, and then calculate the field covered by the lens.

The first essential is to level the camera so that it can be turned round in any direction desired. Next focus the extreme distance, and mark it on the black-board; then focus an object in middle-distance and another one in the foreground, and mark in like manner. It will be found much safer to use these marks for focus in many instances than to take a fresh focus, because in windy weather, or under difficulties, it is not always easy to hit off the best focus, and at other times there may be no object to focus.

Always photograph in the direction in which there is good light and contrast on the water. Unless you get a good light on the water and object, the development of the picture will be exceedingly difficult, owing to the entire absence of contrast. The evening sunlight often gives pictures full of beautiful half-tone. Over-exposure must be avoided, as it tends to reduce the contrast.

Development of Instantaneous Work.—For a half-plate, dissolve 2gr. of pyro in 2oz. of water. Flow this over the plate, rock well, and keep a good distance from the red light. Have by you a 10 per cent. solution of bromide of potassium, also an ammonia solution, half ammonia and half water. Put about one-third of the amount of ammonia and bromide recommended in the maker's formula, and return the pyro solution from the dish to the same, thoroughly mix, and then flow over the plate. Give it two minutes' rocking, and if the high lights then appear and the other detail follows, do not add any more alkali, but let development proceed slowly. Remember that it is often extremely difficult to get contrast in sea-scapes, and, therefore, unless in cases where the most favourable circumstances are present, it will be necessary to let the development work out slowly for thirty minutes, and very frequently an hour or an hour and a-half will not be too long in order to secure the best possible results. A slow, patient development will give a much more delicate negative than one produced quickly by an excess of alkali and an over-increased supply of pyro and bromide. Few, however, possess the necessary amount of patience to develop a negative slowly; but slow development gives the highest results in ordinary as well as in instantaneous work.

In practice it will be found that about one-half the quantity of the alkali given in the maker's formula brings up the high lights. When these have progressed, somewhat more may be added, according as the plate seems to require it. If the high lights appear very slowly, it is doubtless a case of under-exposure, and more alkali must be given. If the high lights come too quickly, more bromide solution should be added.

In case of a prolonged development, it is as well to apply a fresh developer every twenty minutes, and thus avoid stain. When the development is nearly complete—if the shadows are still without detail—add a few drops of ammonia solution in order to veil them, and by this means avoid bronzing in the printing.

Instantaneous photographs should be fully developed, and should be as full of detail and quite as sharp as any other class of picture. Many amateurs seem to think that, as the probability is most instantaneous pictures are under-exposed, there is therefore a reasonable excuse for the absence of detail. In nine cases out of ten the lack of detail is entirely due to under-development.

Fast plates require the greatest care in the dark room. They should be put into the slide in almost complete darkness, and during development they must be shaded from even the safest lamp, and on no account be held up for examination to the light.

Useful Hints.—Street scenes form an interesting field for instantaneous work. Much longer exposures, however, will be necessary for crowds of people than for sea scenes. The lens must be more rapid, that is to say, a Rapid Rectilinear must be used, and the plates must be of the most sensitive kind.

The camera is manipulated in much the same way for instantaneous photography as for ordinary work. The shutters of the dark-slide should not be drawn until the exposure is about to take place. Avoid worry and hurry. Watch carefully and patiently for the desired effect. "Snap" goes the shutter, and the picture is secured.

Many amateurs fail in the shutter work by exposing just too soon rather than too late. Be on the alert, however, to hit exactly the critical moment.



CHAPTER XI.

Outdoor Portraiture—Indoor Portraiture—Hints for Successful Indoor Work, &c.

Outdoor Portraiture, given a suitable light and favourable surroundings, does not present half the difficulties to the amateur as work attempted indoors. The chief point to mind out of doors is to cut off the glaring top light, and a piece of canvas, a large umbrella, or even the branches of a tree, will admirably effect the purpose. Portraits in the open air should never be attempted in blazing sunlight, but a shady spot should be selected.

A garden always supplies a suitable background for this class of work. An old ivied stump, trailing plants, the doorway of a rustic summer-house—each or all of these always wonderfully enhance the charm of a portrait. A brick wall should always be hidden from view, as a background of this character looks so very unsightly. An ordinary blanket answers admirably for the purpose. "Feltine," ordinarily used for putting beneath carpets, and purchasable from any good draper's establishment, also makes a very effective background: its only drawback is that it is exceedingly tender, and on this account should permanently be tacked to a light, movable frame. If a lighter background is required at any time, rub

slightly over its surface with a duster a little finely-powdered whiting. Some amateurs prefer to use, on account of its portability, a background known as the "Empire Patent Cloth," a stout flexible material, which can be purchased from any photographic dealer, in a variety of tints and in any size. Perhaps a piece 10ft. by 8ft. is the most useful size for the ordinary amateur. By all means avoid fancy-painted backgrounds of a pretentious nature, so repugnant to those with art tastes.

Do not light the person to be photographed entirely from the front, or a flat, tame picture will be the result; or, on the other hand, place him (or her) in such a position as for one side of the face to be brilliantly lighted, and the reverse in dark shadow. A compromise, so to speak, between the two is the thing to be aimed at.

The artistic arrangement of a group will tax to the utmost the skill and taste of the operator. By all means avoid stiffness and formality: nothing looks so bad as the "all-in-a-row" arrangement. The figures, too, should not be placed too far from each other, or some will be sure to be out of focus, unless a very small stop be used, which is by no means advisable. Arrange naturally, and do not let all the faces be turned in a stolid gaze towards the lense of the camera. Dogs and babies are simply an abomination in a group and should be omitted, as they are sure to move at the critical moment and spoil the photograph.

Indoor Portraiture.—To produce a well-balanced and artistically-lighted portrait is by no means an easy task, even for the fortunate amateur who can afford the luxury of a well-appointed studio. The latter, however, is within the means of very few. For the majority

an ordinary room has to suffice, and in order to surmount the necessary difficulties all manner of dodges have to be resorted to so as 'to secure passable pictures. The natural consequence of all this is that very few amateurs succeed with indoor portraiture, and after repeated attempts finally give it up, confining themselves in the future to outdoor groups with natural backgrounds. At the same time there is no reason at all, if only the necessary trouble be taken, why an amateur in almost any ordinary room should not produce very creditable results.

Successful portraiture is worth all the trouble taken. "Landscapes"—to repeat what my friend Mr. Adcock, the well-known amateur photographer, said in 1887 to the members of the Camera Club—"are ever with us. Wales, Dovedale, the Trossachs, the Grand Mulets, may be found any time. Views of these are plentiful as bundles of straw, and about the same price, but the face of your three-years-old child of to-day will not be there next year. It will be gone for ever, and will be replaced by one a year older, which year by year will again change. Your father, with whom you spent last New Year's day, may, by another, have passed away. The last portrait he sat for was ten years ago, and you have no registered remembrance of him in his later years. But, say you, our children and fathers get taken professionally. Pardon me—in the sense I wish to convey—they do not. It is only when children are taken by their parents that all the phases of their growth and appearance are, at short intervals, secured."

The point for which Mr. Adcock contends was graphically touched upon recently by a member of the Edinburgh Photographic Society. This gentleman's

remarks are worth quoting from my note-book: "How different is the expression of a lady or gentleman when at their own table, or in the midst of friends on any social occasion; how vastly different from what we see them when about to take the cap off the lens! An active consciousness enters in and deprives the picture of natural grace and beauty as well as freedom of expression. The hands very often suffer, losing entirely their natural disposition. When you are thoroughly acquainted with your subject you cannot be deceived by this conscious expression, and you can remind your sitters that they are not looking like themselves. Now how can this be said or done when ten minutes previously you did not know such a face was in existence?" So, you see, amateurs as well as professionals have their own peculiar advantages. A few hints, therefore, on indoor work cannot but prove of great service to the beginner.

Hints for Successful Indoor Work.—The amateur out of doors generally errs on the side of over-exposure, while with indoor work the reverse is usually the case. Undoubtedly the lesser evil of the two is "over-exposure," for with careful development and subsequent intensification a decent negative can be produced from a plate which has been considerably over-exposed. On the other hand, but little, if anything, can be done with an under-exposed one, the resulting picture being full of harsh contrasts and lacking in detail. Delicacy and softness are the peculiar charm of a good portrait, and in order to bring about this pleasing result slight over-exposure is a positive advantage rather than otherwise.

It is a great mistake to place the person to be photographed too near the light, if artistic results are

to be aimed at. For the best effects, too, the light should be admitted from as high an angle as possible. Naturally the light from the top of the window will be very much stronger than that from the bottom, for while the former is direct from the sky, the latter will probably be only reflected light.

The blinds, especially if they are Venetian ones, with curtains and all other window encumbrances, should be removed. In order to soften the light, place sheets of tissue, or thin oiled paper, in front of the windows; this will diffuse the light wonderfully, its effect being to subdue all shadows and dark contrasts. The lower part of the window should be covered with thick brown paper. Place the sitter at some little distance from the window, and plant the camera in the corner nearest the light. The best positions, and the best time of day for photographing in any particular room, can only be learnt after some considerable experience.

Before attempting to "take" a friend, it would be as well to practise for a few weeks with a plaster head placed on a table; or a life-sized figure would be better still, if one were available. Above all things, do not be afraid of trouble, but move and re-move the model in all conceivable positions, observantly noting the curious effects of light and shade produced by varying the angle of light on the object. Most amateurs are of opinion that an angle of 45deg. will produce the most pleasing results.

Exposure indoors is necessarily protracted, therefore it is strongly advisable to use the fastest plates and lenses possible. For this reason, also, use the largest stop, and choose such a position as will be the least trying to the sitter. Focus for the eye, and remember

always to expose for the shadows. In the after-manipulation use a weak developer, that is to say, a developer weak in pyrogallic acid and ammonia, and by no means hurry development.

With regard to the most suitable lens for portraiture indoors, of course the portrait lens is undoubtedly the best on account of its speed; but if the amateur does not include one of these in his kit, then the Rapid Rectilinear Doublet will be the next best for the purpose.

In order to soften the shadows on the dark side of the face, or to lighten up the darker portions of the body, use a large sheet of white paper or a white table-cloth as a reflector: it is simply astonishing what satisfactory results either of these simple contrivances will produce. For artistic posing and lighting, study the works of our best portrait-painters either in the National Gallery or in the best provincial collections. In the examination of all first-class portraits it will be observed that everything is made subservient to the figure, while in the figure itself all the lights are subordinate to the light on the face. Really good posing is as difficult as correct lighting, and demands equal skill.

The elementary art principles so lucidly laid down by Mr. H. P. Robinson in his three capital little art manuals entitled, "Pictorial Effect in Photography," "The Studio, and What to do in it," and "Picture Making by Photography," should be thoroughly mastered by every aspiring amateur photographer.

Bear in mind that literal delineation is not art. Besides, too often a lens exaggerates an imperfection. A stout person should never be photographed in a sitting position, or the neck, which in such cases is

generally short, will disappear altogether in the photograph. The difficulty may be obviated by taking such a person standing, placing the camera a little below the level of the head. The other extreme, say a tall young man, nearly all legs, should be taken in a sitting pose.

The two sides of a face of hardly any person are alike, and one side is almost sure to give a more pleasing photograph than the other, if a side view is taken. Study, therefore, each particular side of the face with a view of selecting the best. Again, the noses of various people differ amazingly. Place the camera so that the lens looks down at the short, or up at the long, or else long noses will be made longer, short shorter, and the wrath of the victim descend mercilessly on the head of the poor operator for emphasizing a sore point. It is wonderful how simple defects may be remedied by trivial dodges of this sort, which, if disregarded, greatly exaggerate the evils.

No amateur will succeed to any great extent as a portraitist who does not exercise a constant and intelligent observation on all that affects his sitters. Little details, which to a careless or unobserving mind are regarded as "trifles light as air" and quite beneath their notice, often play a vital part in the success of a picture. A turn of the head an inch higher or lower, the raising or lowering of the eyes ever so little, the slightest change in position, each and all are important factors in successful portrait taking that must on no account be overlooked by the amateur.

CHAPTER XII.

Lantern Slides and Transparencies.

THE fortunate possessor of a magic lantern is always a special favourite with children, and doubtless one of the chief pleasures of the amateur photographer is the production of lantern slides for the entertainment of his friends, old as well as young. Photography of late years has done much to elevate the lantern from a toy to a science teacher. The old hand-painted "daubs," fit only for the amusement of unintelligent children, are, happily, a thing of the past. Photography supplies lovely pictures, true to the tiniest bit of detail, even down to the lichen on an old castle ruin. All the world of nature, animate and inanimate, can be faithfully portrayed on the canvas. Nothing can escape the lens. A piece of foreign landscape, the internal economy of a *Volvox globator*, the tiger in his jungle, a veritable war scene, and a thousand thousand things beside, can be thrown on the screen for the amusement and edification of an audience. No wonder that to the home-abiding in the country magic lantern entertainments are so extremely popular! Even lanterns have undergone as great a revolution as the slides themselves. The disagreeable-smelling, old-fashioned

oil lantern is no more like the modern one than the old farthing dip is like the modern sperm candle. Many amateurs, too, now wisely "go in" for lime-light.

Undoubtedly, every amateur photographer should possess a good magic lantern. It is not only useful to throw pictures on the canvas during the long winter evenings, but can be turned to the greatest advantage in the production of enlargements on the new bromide paper.

A good negative is as essential to give a good lantern slide as it is to give a good print. The best negatives for lantern slides are those with plenty of contrast. A thin, poor negative will give but an indifferent slide. The standard size of all lantern pictures is $3\frac{1}{4}$ in. by $3\frac{1}{4}$ in., and in order to produce these, gelatine prepared plates cut to these dimensions will be required. These can be purchased cheap from any photographic dealer, but for a make-shift, an inch cut off an ordinary quarter-plate in the dark room, by means of a diamond or an American glass-cutter, will serve the purpose in case of an emergency. This, however, should only be resorted to when the amateur is out of the special lantern-plates, which it is far better to use, as a rule, on account of their being specially prepared with an emulsion more suitable for lantern work than the ordinary plates. In addition to this, too, they are made of a special thin glass, more adapted for use in the lantern than the thick glass of negatives.

If the negative from which it is wished to obtain a lantern slide is either quarter-plate or 5 by 4, contact printing should be resorted to for the production of the necessary positive. Select a suitable negative, lay it in a printing-frame film side up, as though about

to take a silver print from it, placing a lantern-plate film side downwards, instead of a piece of albumenised paper, as in the case of printing. Then fasten the back of the frame in the usual way. All this, of course, must be manipulated in the dark room. Both the negative and the lantern-film should be carefully dusted before printing, as any little speck of dust left on the film is rendered very conspicuous on the canvas through the magnification of the picture. Be very careful to adjust the lantern-plate on the negative to a great nicety, so as to secure the particular portion of the picture desired. This can readily be managed by holding the negative up to the light of the red lamp. For safety's sake, however, it is not advisable to take the undeveloped plate too near the light of even the red lamp.

The plate is now ready for exposure. Gas-light is sufficiently intense for the purpose, and by far the most convenient. If the amateur is not so fortunate as to possess a dark room with gas, then exposure to the flame of a good paraffin lamp will have to suffice. Expose the face of the printing-frame some 16in. or 18in. away from the light, in such a manner that the whole surface of the plate is equally illuminated. An exposure of ten seconds to gas, and perhaps double that time with an oil lamp as an illuminant, will be found sufficient for a negative of about correct density and a gelatine plate of average rapidity. Full directions as to length of exposure will be found supplied with the plates, and these should be strictly followed, as the respective manufacturers alone know the rapidity of their own emulsion. In the case of a thin, weak negative, increase the exposure, and hold the printing-frame some 3ft. or 4ft. away from the light. A very

dense negative must, of course, be held closer than the normal distance from the light. Correct exposure is a very important point, and can only be arrived at after repeated experiments.

There are many methods of developing lantern slides, and, of course, the ordinary "negative" development can be utilised in the making of the positives. A special development, however, is best for these plates, as the ordinary pyrogallic acid and ammonia developer is apt to impart a disagreeable yellow tinge to the plate, very noticeable when the image is thrown on the screen.

Cowan's gelatino-chloride plates are strongly to be recommended; they differ entirely from the usual bromide films, being very transparent and of a deep orange-colour by transmitted light, but are capable of development to any density required. Strange to say, though extremely sensitive to daylight, they are much less so to gas-light, so that more artificial light may be used during development than with bromide plates. This is a great point gained during the process of development, as the plates may be safely examined from time to time, within a reasonable distance of a gas-flame, and the density thus regulated to a great nicety.

The following developing formulæ are recommended by the manufacturers, and give beautiful results :

NO. I.—FOR COLD TONES.

Potass citrate	136gr.
Potass oxalate	44gr.
Hot di-tilled water	1oz.

NO II.—FOR WARM TONES.

Citric acid	120gr.
Ammonia (carbonate,	88gr.
Cold distilled water	1oz.

NO. III.—FOR EXTRA WARM TONES.

Citric acid	180gr.
Ammonia (carbonate)	60gr.
Cold distilled water	1oz.

In mixing the solutions Nos. II. and III., it is advisable to place the crystals of the salts in a deep vessel, and after adding the water to leave alone till all effervescence ceases. Make overnight. To three-parts of any of the above formulæ add one part of the following at the time of using :

Sulphate of iron	140gr.
Sulphuric acid	1 drop.
Distilled water	1oz.

To develop, place the exposed plate in a porcelain dish, flood over with sufficient of either of the solutions just mentioned, and keep the dish rocking. The time required to complete development will vary from one to ten minutes, according to the developer used and the density required. The first formula given is the quickest, and the last is the slowest, developer. A great variety of tones may be obtained by mixing the first and last developers together in different proportions, and altering the exposure to suit the developer. The addition of from five to ten minims of a 10 per cent. solution of sodium chloride to each ounce of developer will considerably modify the colour, allow of much longer exposure, and be valuable when very rich, warm tones are required. After development, the plates are washed and fixed in the usual manner.

Many amateurs "swear by" the "soda" method of developing for this purpose, and doubtless it is a good one for lantern slides, the only objection to it being the yellow cast it imparts to the picture, especially

if the operation be a prolonged one. A cleaning solution, however, containing iron, will remedy the evil. The following is the formula :

SODA SOLUTION.

Common washing soda	1oz.
Water	20oz.
Bromide of ammonium	8gr.

PYRO SOLUTION.

Pure sulphite of soda	128gr.
Water	4oz.

Test the above with a strip of litmus-paper, and if it indicates an alkaline reaction, add a few drops of citric acid solution. When the litmus-paper turns red, add 32gr. of pyrogalllic acid.

To develop, add 1dr. of the pyro solution to 7dr. of the soda one. Providing the exposure has been correct the image will appear clearly and slowly, and the required density be attained by simply giving the plate a sufficient time in the bath. Gently rock the dish during development, as with the alkaline method. As a rule, it is by no means advisable to push density too far for lantern slides. After development, wash and fix as customary.

If the plate has been over-exposed, a fogged slide, useless for lantern purposes, will be the result. The best plan is to throw such a plate on one side, and expose another one, giving this time, say, half the previous exposure.

For black-and-white tones, develop with "Ferrous Oxalate." The following is the formula :

OXALATE SOLUTION.

Neutral oxalate of potash	1oz.
Bromide of potassium	2½gr.
Hot distilled water	5oz.

IRON SOLUTION.

Pure proto-sulphate of iron	2dr.
Hot distilled water :	2oz.

To develop, mix together two parts of oxalate solution with one part of iron solution, and pour in one wave across the plate. Rock well during development, which it is advisable to continue as long as detail is visible in the high lights of the picture. Rinse well after development, and previous to fixing. The fixing solution should be of the strength of 1oz. in 4oz. of water. The hyposulphite of soda solution should not be mixed till required, as a trace of this salt in the developing-bath is ruinous.

Berkeley's sodic-sulphite developer also gives beautiful black-and-white tones, and as the formula is the essence of simplicity, it is well worth quoting. It is suitable for developing either ordinary negatives or lantern slides.

PYRO SOLUTION.

Pyrogallic acid	$\frac{1}{4}$ oz.
Pure sulphite of soda	1oz.
Bromide of ammonia	150gr.
Citric acid	60gr.
Nitric acid	5 drops.

Water up to 3 fluid oz.

The above solution will keep almost indefinitely.

AMMONIA SOLUTION.

Ammonia (880)	1oz.
Water	$\frac{1}{2}$ oz.

In use take

Water	2oz.
Pyro solution	1dr.
Ammonia solution	4 minims.

Add in judicious instalments. Wash well after development, then place in the alum bath, rinse, and fix in the usual manner.

In the case of transparencies for window decoration, development should be carried much farther than for lantern slides, as strong, vigorous images are the best for this purpose. Transparencies may be used with very pretty effects in various ways for household decoration—for screens, hall lamps, and in numerous other ways.

Successful mounting of lantern slides requires much skill and care. Suitable black masks can be purchased very cheaply from any photographic dealer. One of these should be laid neatly on the film, and a thin protecting glass placed over this, the whole being bound together either by stout paper or thick black ribbon. The title of the picture should be previously written on the mask with white paint; or Chinese white, diluted with water, can be used admirably as a white ink for the purpose.



CHAPTER XIII.

Bromide, Argentotype, Alphatype, and Platinotype Processes.

Bromide.—A silver print undoubtedly is “a thing of beauty,” but unfortunately not “a joy for ever.” However thoroughly prints may be washed, however careful one may be in the choice of mounts and mountants, assuredly there will come a day, sooner or later, when our cherished prints will exhibit signs of fading. Prints on the new bromide paper, in black and white, however, are said to be permanent. The process is simple to work, and the results are exceedingly beautiful; while there is a further advantage to be claimed in their favour, namely, that we are enabled to secure prints quickly from our negatives in the long winter evenings, when it is almost impossible to secure silver prints.

For enlarging purposes, nothing equals in simplicity and effectiveness this new bromide-paper process. There are many brands of bromide paper in the market, and perhaps that of Eastman's is as good as any. It can be purchased in packets ready cut for use to the exact size required, in three grades, marked respectively A, B, and C. The A brand is a thin paper with a smooth surface, suitable for being burnished or enamelled; B is a heavy paper with smooth surface; while C is

a heavy paper with rough surface, which looks very artistic for landscape views. The C paper, undoubtedly, is the most popular amongst amateurs.

The quality of the finished prints depends, in a great measure, as with silver paper, upon the quality of the negative. A brilliant, well-balanced negative gives the best results. The paper is exceedingly sensitive to light, and must be manipulated only in the safety of the dark room. Prints may be taken by day-, gas-, or lamp-light, but gas is the best and most convenient for the purpose.

Two factors regulate correct exposure, namely, the density of the negative, and the intensity of the light used. A few experiments, however, will soon ascertain this, which being arrived at should be noted down as a guide in future printing. From eight to ten seconds, 1ft. from a gas-burner, for a negative of average density, will be found to approximate to the right exposure.

These negatives should be printed by a weak light, held some considerable distance from the flame, and given a longer exposure. By this means a vigorous print may be obtained from a negative that would otherwise be too thin and flat. Very dense negatives are best printed by daylight.

The following are the developing formulæ :

I.—OXALATE OF POTASH SOLUTION.

Oxalate of potash	.	1lb.
Hot water	. . . . .	48oz.

Acidify with sulphuric, acetic, or citric acid, and test with litmus-paper according to previous instructions (page 74). About 3dr. of acetic acid will be found sufficient for the purpose.

II.—IRON SOLUTION.

Proto-sulphate of iron	. . . . .	1lb.
Hot water	. . . . .	32oz.
Acetic acid	. . . . .	$\frac{1}{2}$ dr.
[Or if substituted for acetic, citric acid		. $\frac{1}{4}$ oz.]

III.—BROMIDE SOLUTION.

Bromide of potassium	. . . . .	1oz.
Water	. . . . .	32oz.

These solutions keep well separately, but must be mixed only for immediate use.

CLEARING SOLUTION.

Acetic acid	. . . . .	1dr.
Alum	. . . . .	$\frac{1}{2}$ lb.
Water	. . . . .	32oz.

FIXING BATH.

Hyposulphite of soda	. . . . .	3oz.
Water	. . . . .	16oz.

To develop, mix strictly in the following order:

Oxalate of potash solution	. . . . .	6oz.
Iron solution	. . . . .	1oz.
Bromide solution	. . . . .	1dr.

After exposure, and previous to development, soak the paper in clean water till limp; then place in the developing-tray and pour developer over in one even wave. The image should appear gradually; and when the shadows are sufficiently developed, but before the picture gets too dark, take out and place, without washing, in the clearing-bath. Use plenty of clearing solution in the bath. After remaining immersed for a minute or so, pour the clearing solution off and apply a fresh dose, repeating this a third time; next rinse well, and immerse in the fixing-bath. When

fixed, wash thoroughly for an hour and then hang up to dry. If a large number of prints are required, it is best to develop one by itself, so as to ascertain the correct exposure of that particular negative, and then afterwards to defer development till the whole of the printing is complete. Clear immediately after development, and then place the print in a vessel of clean water to wait till all are developed and "cleared," so that the whole may be fixed at one time in a large vessel suitable for the work. Before being fixed, it is necessary to keep the prints perfectly dark, and, should printing be done in the dark room, they must be covered up well.

With bromide paper no toning is required. The dish used for the development of these prints should be devoted exclusively to that purpose.

Four things are necessary in order to avoid yellow-looking prints: (1), The developer must be acid; (2), The clearing solution must be used precisely as directed; (3), The hyposulphite of soda must be freshly mixed for the fixation of each batch of prints; (4), The prints must be subjected to a most thorough washing after being fixed.

Those who prefer prints with a high gloss should squeegee them, wet, face downwards, on a polished piece of ebonite; when dry the prints will peel off with a fine enamelled surface.

Be extremely cautious not to have the slightest trace of either pyrogallie acid or hyposulphite of soda about during the manipulation of bromide prints, or the results will be most disastrous.

Bromide prints must be mounted dry, and the drying must not be hastened by means of blotting-paper, as in the case of silver prints. To mount, brush the back

with thin starch paste, lay the print on the mount, and rub into contact with a soft cloth.

Platinotype.—Perhaps of all permanent black-and-white processes, that known as “Platinotype” is the most beautiful. The printing has to be done by sunlight, but is a much quicker process than printing on silver paper. No fixing is necessary, and the final washing is complete in half an hour. This is a great saving of both trouble and time. The prints, too, when finished are absolutely permanent, while the necessary manipulations are the essence of simplicity: The prints are exposed in exactly the same manner as silver prints, but only take a third of the time. Afterwards they are developed in a solution of oxalate of potash. They are then immersed for a little while in a weak acid bath, and after being finally washed are ready for mounting.

Platinotype paper has peculiarities of its own. It is not only extremely sensitive to light, but also to damp, by which is meant even the invisible vapour always present in the atmosphere, even on the driest day. In order, therefore, to guard against this, the paper has to be kept in special tin tubes, at the top of each of which is a perforated box, containing, in a muslin bag, a small quantity of chloride of calcium, a salt which quickly absorbs every particle of moisture with which it comes into contact. The joints of the tubes are covered with indiarubber bands, so that every precaution is taken to keep out the insidious foe. When the chloride of calcium becomes damp from long use, it must be dried in the oven, or over the fire upon a shovel, and then replaced. Even during the short period that the paper is exposed while printing, it is essential to place a piece of thin, vulcanised

indiarubber between the paper and the pad, so extremely sensitive to damp are the salts of iron and platinum with which the paper is coated. After exposure the prints must be again replaced in the calcium tubes, where they must remain till the actual time of development. Neglect of any of these necessary precautions will result in the prints lacking "pluck," and exhibiting dullness of tone, with dirty, impure whites.

Previous to exposure the paper is of a lemon-yellow tint, but afterwards it changes to a greyish-brown. The difficulty to the tyro is to know when printing has been carried far enough, for prior to development only a faint indication of the picture is visible. The beginner, however, will soon acquire the necessary knowledge after a few experiments.

Care must be taken not to expose the prints unduly to light during the examination of them in the printing-frames. The Platinotype Company supply all necessary articles for the process, and these can be purchased for a nominal sum. An enamelled iron developing-dish, a spirit-lamp, tripod for same, and a thermometer, are the principal requirements.

The following is the developing formula :

Oxalate of potash	130gr.
Water .	1oz.

Any quantity of developer may be made up, as the solution will keep indefinitely. The oxalate of potash must be dissolved in hot water, and mixed to the strength of the above formula; 1lb. of oxalate of potash to 54oz. of water being, for all practical purposes, sufficiently accurate.

The prints must not be immersed, but floated face downwards on the solution. To do this successfully,

hold the print by the two extreme corners, slightly bend in the form of a bow, and then release. Development is effected in a truly magical manner in a few seconds, for when the paper is lifted out of the developing-bath, it will be noticed that the weak, grey image has given place to a brilliant black picture full of the richest detail. Immediately after development, the prints are subjected to immersion in a weak acid bath. This clearing solution is composed of pure hydrochloric acid, diluted to sixty times its bulk with water. The prints should pass through at least three separate dishes of this acidulated water, being left face downwards in each for about ten minutes.

If the solution in the last bath is perfectly transparent after the prints have remained in it the necessary time, clearing may be considered complete; but should it show the slightest tinge, they should be passed through a fourth bath. Thorough clearing is very essential, for should it be imperfectly done, the purity of the whites is sure to be lost in the finished prints. The object of these acid baths is to remove every trace of iron from the paper, after which metallic platinum is the only chemical remaining in its fibre. This is the great secret of the permanency of prints in platinotype, since the metallic platinum forming the image resists all chemical agents, with the exception of hot "aqua regia." Prints that can withstand all these tests must be permanent.

Some amateurs prefer to use citric acid for the clearing-bath in place of hydrochloric, as it does not soften the paper like the latter. If citric acid be used, the following is the formula:

Citric acid	.	.	.	.	.	1oz.
Water	.	.	.	.	.	20oz.

With either bath prints must *not* be washed after development, but transferred at once to the clearing solution. When all the prints have been developed, the remaining solution should be poured back to the stock for future use; the only precaution necessary being to keep it in a dark cupboard well away from the light. The solution in time deposits green crystals; it should then be filtered, and fresh oxalate of potash added so as to keep up the original strength.

Textile fabrics, as well as paper, can be purchased coated with the platinotype emulsion, and in the development of these immersion in the solution is necessary.



CHAPTER XIV.

*Chloride of Silver Emulsion—Printing-Out Paper—Eastman's
Solio Paper—Ferro-Prussiate.*

Chloride of Silver Emulsion.—This paper is exceedingly beautiful, and, when well manipulated, vastly superior to the ordinary albumenised paper. The whites in the finished prints are specially noted for their purity. The best results are obtained by printing a little darker than the depth required when finished. Before toning, wash in six changes of water at about 65deg. Fahr., and keep them moving, so as to prevent air-bubbles forming. Tone with sulphocyanide of ammonium and phosphate of soda, adding to each 8oz. of water used 2scr. each of these and 1gr. of gold. Leave in this bath till purple-brown by transmitted light. Fix, without washing, for fifteen minutes; then wash well for at least six hours. To enamel, lay the print face downwards while wet on talced glass, and, when dry, it will peel off with a highly-glazed surface. Or the following formula can be recommended :

STOCK SOLUTION.—No. I.

Sulphocyanide of ammonium	.	.	.	.	5dr.
Hyposulphide of soda	.	.	.	.	15gr.
Water	.	.	.	.	35oz.

No. II.

Chloride of gold	.	.	.	.	15gr.
Distilled water	.	.	.	.	1oz. 6dr.

Both these solutions will keep indefinitely. In use, take 100 parts of No. I., 10 parts of No. II., and 50 parts of water, pouring the latter into the former and stirring up vigorously. The prints will first turn a bright brick-red, then brown, then purple, and finally to a bluish tint. Before they reach this stage toning should be stopped. It is the best plan to tone only a few prints at a time, as a better control is kept over them, and we shall be more likely to succeed in toning them to the exact tint we wish than if we tone a great number *en masse*.

After being toned the prints are washed in water, and finally fixed in a 10 per cent. solution of hyposulphite of soda, in which they are immersed and kept moving for about five minutes. Wash most thoroughly after fixing, and in order to harden the prints, soak them for ten or fifteen minutes in a 5 per cent. alum solution. Afterwards wash for an hour.

Printing-Out Paper ("P.O.P.").—This paper bids fair to entirely supersede the ordinary silver print. Better prints can be made from weak or thin negatives with this paper than on ordinary albuminized paper. The formula given by the Ilford Co. cannot be beaten, and is as follows: 30gr. of sulphocyanide, dissolved in 16oz. of water, to which are added 2gr. of chloride of gold. The solution should stand two or three days before use, and the bath is greatly improved if a few drops of gold-chloride solution are added immediately before using. The great secret of success is thorough washing between each process. After the prints have been well "cleared" place them in an alum bath, containing 2oz. or 3oz. of alum to the pint of water, for 10min. Before being immersed in the toning bath,

the prints must be well washed in order to remove all traces of alum from them.

Eastman's Solio Paper. — This paper is coming greatly to the front, both for excellence of quality and facility of manipulation. Its use ensures a most exquisite finish, and tones may be produced varying from a Bartolozzi red or warm sepia to the richest purple. The following combined toning and fixing bath (a great convenience to amateurs) is specially recommended :

STOCK SOLUTION "A."

Hyposulphite of soda	8oz.
Alum (common)	6oz.
Water	80oz.

When dissolved add :

Borax (2oz. dissolved in hot water)	8oz.
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Let it stand overnight and decant the clear liquid.

STOCK SOLUTION "B."

Chloride of gold	15gr.
Acetate of lead (sugar of lead)	64gr.
Water	8oz.

Solution "B" should be shaken up before using, and not filtered. For use take :

Stock solution "A"	8 parts
Stock solution "B"	1 part

Place the prints without previous washing into this bath.

The above bath must be used cold—not above 40deg. or 50deg. Fahr. This condition can be obtained by placing a piece of ice in the bath when toning. If the bath is used too warm, the result will be yellow prints, with a greenish cast in the half-tones.

Ferro-Prussiate.—This is extremely convenient and useful where several copies are required of drawings, plans, maps, &c. The paper may be bought ready sensitised for use, or the amateur may easily sensitise his own in the dark room. The following is a good formula, given by Captain Abney in his "Treatise on Photography." This process gives white lines on a blue ground :

A {	Potassium ferricyanide	2½oz.
	Water	10oz.
B {	Ammonio-citrate of iron (ferric salt)	2½oz.
	Water	10oz.

Dissolve separately, and then mix together in the dark room. It is essential to keep the solution away from the light. A smooth-surfaced drawing-paper is the best for sensitising. Coat the paper evenly with the above solution, using a sponge for the purpose, and then hang or pin up to dry in the dark room. It is advisable to keep the paper three or four days before using.

Printing is effected in the ordinary manner, an exposure of five or six minutes to good strong light being required. Printing has been carried far enough when the paper assumes a bronzed appearance. Blue prints require neither toning nor fixing, all that is necessary being to soak them in a dish of clear water, so as to eliminate all the soluble salts from the surface of the paper. A sponge dipped in water may be used for the purpose. After being thus developed with water, the prints are hung up to dry.

Positive.—Messrs. Morgan and Kidd's "Positive" paper cannot be passed by without notice. It is

exposed much in the same way as the "Bromide" and "Alpha" papers. For a negative of medium density, an exposure of about thirty seconds to gas-light at a distance of 1ft. will be found about correct. It is not advisable to use daylight as an illuminator, as the paper is so extremely sensitive to strong light, and consequently exposure cannot be gauged with accuracy. A thin negative with clear shadows gives the best prints with this paper. In exposing, take care that the whole surface of the negative is equally illuminated. Hold a dense negative closer to the light than the normal distance; a thin one, farther away. The ferrous-oxalate method of development suits the paper best. A wonderful variety of results can be obtained by modifying the proportions of the two solutions.

To develop a print from a hard, dense negative use a very small quantity of iron solution. About one part of iron solution to twelve of oxalate will be quite sufficient, using a single drop of bromide solution to every 3oz. of developer. In the case of a print from a thin, delicate negative, add as much iron solution as the oxalate will take up. In practice, this will be found to be one part of iron to three of oxalate.

It printing from weak negatives, give a short exposure, and develop very slowly. Soak the prints well before pouring the developing solution over them. Assuming that the exposure given has been correct, the picture should appear in about half-a-minute, and development be complete three minutes later. Prints develop, however, much quicker in warm weather than in cold.

In order to obtain bold, vigorous contrasts, develop slowly: to avoid these, use a strong developer and

hasten development. During development rock well. Weak portions of the picture may be amazingly strengthened by local development. Apply the developer to such parts with a soft camel-hair brush. To obtain prints of good colour, use the bromide solution very sparingly. It must be borne in mind, too, that the shadows darken very much in the fixing-bath, and compensation must be allowed for this. The prints are passed through a clearing solution, in much the same manner as directed for bromide, and afterwards thoroughly washed before being placed in the fixing-bath. Fixation is complete in about fifteen minutes. Wash the prints thoroughly for six hours after they are taken out of the fixing solution.

Should the prints after the final washing show any signs of yellowness, immerse them in the following clearing solution :

Sulphuric acid	.	.	.	1oz.
Water	.	.	.	80oz.

Positive paper can be bought specially prepared to give a matt surface, which is far more artistic in appearance than a highly burnished one.

CHAPTER XV.

Stereoscopic Work—Enlargements—Photo-Micrography— Copying Pictures, &c.

Stereoscopic Work.—That beautiful instrument, the stereoscope—once the charm of every drawing-room—is fast coming into fashion again. Why it should ever have fallen into disuse is a mystery. A photograph never looks so charmingly realistic as when seen through one of these simple, inexpensive, but wonderful instruments. Perhaps one cause of its rapid decline in popular estimation was the unscientific slides with which the market was flooded—spurious imitations, not stereoscopic in effect at all. No better brief explanation of the stereoscope could be desired than the one Mr. Pollit, a well-known amateur photographer, gave recently to the members of the Manchester Photographic Society. I make no apology for quoting it from my voluminous note-book: “The principle of the stereoscope consists of the union of two pictures, dissimilar from each other in so far as that they are photographed from two slightly different standpoints, the difference between those standpoints being about equal to the average distance between the two human eyes, and thus a third picture is formed in the stereoscope by the superposition of one image on the other ;

the resulting combination, being conveyed to the brain, gives the same idea of solidity and relief as that derived from the actual sight of natural objects. The principle is readily illustrated by the simple expedient of photographing, by means of a binocular camera, a ball, on one side of which a black cross has been made. The cross will be perfectly rendered in the view taken by the left-hand lens, whilst the right-hand lens, being a different point of sight, does not depict so much of the cross on that side as to give a completely detached image of it."

In mounting stereoscopic prints taken with a binocular camera, the intelligent reader will scarcely require reminding that the two halves must be transposed, by mounting the right-hand picture on the left-hand side of the mount, and the left-hand one on the right-hand side. The explanation of this is, of course, that all photographic lenses give the image on the plate in an inverted condition. Care must be taken, too, in the trimming of the prints, so that when the slide is finished the corresponding middle-distance objects in each of the two pictures are as nearly as possible 2·75in. apart, which measurement may be taken as a reliable average distance between two human eyes. The amateur, in trimming the prints for mounting, must also be careful that the bottom edge of the picture cuts the objects off in one case exactly as in the other.

Enlargements.—The "enlarging fever" is sure to attack the amateur at some period or other of his photographic career. A few simple hints will give a fair idea of the *modus operandi* of this fascinating department of our art. The easiest and best method of enlargement is by means of bromide paper, the

development of which is similar to that previously given for contact prints with the same paper.

Quarter-plate negatives are by far the best for enlarging purposes, and those who go in for enlarging need no longer be burdened with a large, cumbersome camera. A negative full of sharp, crisp detail, perfect in every way, must be selected for enlargement, for naturally "magnification" renders any defect in the negative more apparent. The sharper the negative the larger the size to which the picture may be enlarged. A quarter-plate negative can reasonably be enlarged up to 12in. by 10in.; but it is not advisable for the beginner to exceed this dimension, until he has had considerable experience in this particular branch of photographic work, at any rate. Given a suitable room, an ordinary camera, by the exercise of a little ingenuity, may be utilised for the work.

In enlarging by bromide paper, either daylight or artificial light may be made use of as the illuminator. Daylight is the simpler and cheaper process of the two, providing the amateur possesses a room suited to the purpose, and can afford the necessary time for the work in the middle of the day; otherwise, an enlarging apparatus will have to be purchased. A room in the top of the house is the best—one with only one window, and that, if possible, one through which there is an uninterrupted view of the sky. All the light must be excluded by pasting thick brown paper over the entire window, with an aperture cut out sufficient to hold a printing-frame of the size of the negative to be enlarged. The frame, of course, must be minus its back support, the negative being held in its place by a narrow strip of wood tacked to the margins of the frame. The film-side must be placed in the frame

to face the room. The printing-frame can be secured in its position by being nailed on strips of wood screwed to the window frame. A small shelf, sufficient to hold the weight of the camera, must be nailed to the window immediately beneath the frame, or a table of the right height would answer the purpose equally well. The camera is so arranged that its lens points away from the window; and a reflector will be necessary to secure the best results. A mirror fixed outside the window at such an angle as will best reflect the light on the negative answers the purpose admirably.

Tack to an easel a large sheet of white cardboard, and place it a few feet from the camera. It will now be found that an enlarged image of the negative will be reflected on the white screen, the size of the picture being regulated by the distance the cardboard is from the camera. When manipulating, substitute a table for the easel, placing on it, sideways, a good-sized box, so as to avoid all danger of the bromide paper altering its position during the critical period of exposure. Cover this with white paper, thus converting it into a temporary but substantial focussing-screen. Rule on the paper the exact size you wish to enlarge your picture to, and then move the box backward or forward—whichever may be required—until the enlarged image of the negative exactly fills the space. Next focus sharply by moving the camera on the shelf, which should be so constructed as to give the necessary room for the purpose. The light being excluded, the bromide paper is next pinned on to the screen; while the bellows body of the camera must be covered well up with a black cloth, so as to exclude the possibility of any light finding its way between the negative and the camera.

Everything is now ready for work. Before, however, actually enlarging, it will be the wisest plan to expose experimentally a few narrow slips of bromide paper, with a view of ascertaining the correct exposure required. Give a variety of exposures, and then carefully develop: the result will teach you far better than the best treatise ever written on the subject. Afterwards these strips should be preserved, and all the essential particulars—such as (1) intensity of light, (2) time of day and year, (3) density of negative, (4) brand of paper, (5) distance of screen from camera, &c.—jotted down in your note-book as a guide for future work.

The notes on development need not be repeated, as they are the same, with a few modifications, as those given for contact printing. Many amateurs “dodge” development of enlargements by painting with the developing solution the parts which require strengthening. Wonderful effects can be secured in this manner, quite surprising to those who have never tried it.

Photo-Micrography.—The many wonders the microscope reveals can now be permanently registered by the aid of photography. Anyone who understands the mysteries of negative-making can produce these charming pictures, so valuable to the student of science, either in the form of silver prints, or as lantern slides improved by enlargement on canvas.

A small-sized camera is the most suitable to use for this class of work. The requisite microscope need not by any means be an expensive one, but it is advisable that it should possess a circular revolving stage, by means of which the object may always be in the centre. One with a short tube, and so constructed that the entire instrument, with the exception

of the foot, can be bent down to the horizontal position is the best. The ordinary lens of the camera must be taken out, and a short tube, lined with black cloth or velvet, substituted, the diameter of which must be such that the microscope tube will easily slide therein. Of course, before this is done the eye-piece of the microscope must be removed. It is advisable to line the microscope tube with velvet in order to prevent any reflected light destroying the brilliancy of the picture.

To photograph, place the microscope perfectly horizontal. Next fix on to the stage of your microscope the object to be photographed, placing behind it your lamp, with condenser interposed, so that the rays of light are concentrated upon the object, precaution, of course, being taken that both lamp and body of microscope are exactly in a line with the centre of focussing screen of camera. Now place the dark cloth over your head and camera, focussing sharply with the fine adjustment. It is best to commence with a power, say, of lin. focus, and when some proficiency is attained, a higher power can be used. Next the screen is folded back, and the dark slide, previously charged in the dark room with a gelatine plate, slipped into position. Before drawing out the shutter of the dark slide, place a black card against the sub-stage in order to shut off the light. This done, draw out the shutter, removing the black card during the necessary exposure.

The correct exposure for this kind of work will soon be ascertained after a few experiments. The lamp-light does not vary in intensity like the light out of doors. Here is one great point gained. Of course the length of exposure required depends in a

great measure on the kind of object to be photographed. Slides mounted with Canada balsam require a longer exposure than others, since this mountant imparts a yellow tinge to the slide. Sometimes, too, the object itself is stained for effect with some dark-coloured dye. The great secret of correct exposure in this, as in all other photographic work, is—brains !

Copying Pictures.—Engravings and other pictures, as well as photographs themselves, can be readily reproduced by aid of the camera. If the pictures are framed, the glass must be removed, or the light reflected from its surface will interfere with the image formed by the lens. Photograph in a good diffused light, and take care that the front of the camera is parallel with the picture, or a distorted copy will be the result. It is always wise to photograph engravings on a reduced scale, otherwise the grain of the paper disfigures the finished print. For this class of work always use a very small stop, and slightly under-expose.

Oil-paintings do not copy well, as the different colours do not by any means produce corresponding tones. Isochromatic plates are the best for such pictures. In copying oil-paintings, light the picture from the direction in which the light has been supposed to come in the picture itself. In order to get the best effects, a picture should be viewed in a particular light—that is to say, the light should be thrown on the picture at a particular angle.

If yellow predominates in the picture to be photographed, place a flat piece of orange-coloured glass in front of the lens. Unless the glass so placed is perfectly flat, the image will be distorted.

CHAPTER XVI.

Useful Notes for Photographers.

Method for Quickly Drying Gelatine Negatives.—After the final washing, place the plate in a bath of methylated spirit for four or five minutes. On taking it out, flow two or three times with common methylated sulphuric ether. After this the negative will dry in a current of air in two or three minutes.

To Take Gelatine off Disused Negatives.—Place in a hot bath, in which previously a good dose of washing-soda and soap has been dissolved.

To Remove Varnish from a Negative.—Warm (cautiously) the negative before a fire or over a spirit-lamp; then pour a little methylated spirit upon it, and with a tuft of cotton-wool gently rub the face of the negative; drain and repeat. Then cover with the spirit, drain, and let dry.

To Prevent Negatives from Frilling.—Soak the plates before development in a saturated solution of Epsom salts. Then wash, and develop as usual; or use water containing a little Epsom salts, $\frac{1}{2}$ oz. or more to a pail of water.

To Fill Cracks in a Varnished Negative.—Procure some finely-powdered lampblack and gently rub with a circular motion all over the negative, using the finger or

a soft piece of wash-leather for the purpose. This will cause all the cracks to disappear.

To Print from Cracked Negative.—Place the printing-frame at the bottom of a narrow box, at least 2ft. deep, and with blackened sides; over the negative in the frame put a sheet of thin tissue paper. Another way: Suspend from a roasting-jack a board upon which a printing-frame can rest, the roasting-jack being in motion all the time of printing. Or, in the case of a slight crack, move the frame about in the hands briskly during the process of printing.

Sensitising Solution for Paper :

Nitrate of silver	.	.	5dr.
Distilled water	.	.	5oz.
Nitric acid	.	.	2 drops
Kaolin	.	.	1oz.

Solution for Reducing Over-density :

A {	Hyposulphite of soda	.	.	2oz.
	Water	.	.	1 pint
B {	Ferro-cyanide of potassium	.	.	2dr.
	Water	.	.	5oz.

Mix $\frac{1}{2}$ oz. of B with 5oz. of A just before use.

Clearing Solution (Edwards') :

Alum	.	.	1oz.
Citric acid	.	.	1oz.
Sulphate of iron	.	.	3oz.
Water	.	.	20oz.

Soak for a minute or two, when clearing should be complete.

Burnishing Solution :

Castile soap	.	.	4gr.
Spirits of wine	.	.	1oz.

Rub on the surface of the print, allow to dry, then burnish.

Encaustic Paste.—The advantages of using encaustic paste for burnishing photographs are threefold: it gives depth, richness, and transparency to the shadows; it renders apparent delicate detail in the lights which would otherwise remain imperceptible; and, lastly, it aids in protecting the surface, and thus tends to the permanency of the print. To use, place on the prints in patches, and rub, by means of a piece of flannel, with a quick, circular motion, until a firm, fine surface is obtained.

The paste is made of the following ingredients:

Pure white wax	. 500gr.
Gum elemi	10gr.
Benzole	200gr.
Essence of lavender	. 300gr.
Oil of spice	15gr.

Cut the wax into shreds, and melt over a water-bath—placing in a jar, and the latter in a pan of hot water, will serve the purpose. Powder the elemi, and dissolve it in the solvent, using gentle heat; then strain through muslin, and add the clear solution to the melted wax, and stir well. Next pour into a wide-mouthed bottle and allow to cool.

Toning Formulæ.—The following formulæ for toning baths will be found useful:

TUNGSTATE BATH.

Tungstate of soda . . . . .	. 20gr.
Solution of chloride of gold	1dr.
Boiling water .	5oz.
Cold water	1oz.

Add the boiling water to the tungstate of soda, then pour the solution of gold into the cold water, and add the two solutions together. It is ready for

use directly it is cold, and will keep for weeks, requiring only to be strengthened from time to time with a little more gold when it tones slowly.

LIME BATH.

Chloride of gold	.	2gr.
Chloride of lime	.	2gr.
Chalk	.	1 teaspoonful
Water	.	16oz

Use the following day.

CARBONATE OF SODA BATH.

Chloride of gold	.	1gr.
Carbonate of soda	.	10gr.
Water	.	10oz.

This bath gives purple and black tones, and must be used immediately after being mixed. Tone to dark brown for the purple tone, and to slight blue for the black tone.

PHOSPHATE OF SODA BATH.

Phosphate of soda	.	100gr.
Chloride of gold	.	1gr.
Water	.	10oz.

Use this bath the day after being mixed, and wash the prints thoroughly before immersing them in it.

PLATINUM TONING BATH.

To make a platinum toning bath, substitute platinum chloride for gold chloride in the acetate of soda bath thus :

Platinum chloride	.	1gr.
Acetate of soda	.	30gr.
Water	.	8oz.

Dip a piece of blue litmus-paper into the bath ; if it turns red it is acid, and a solution of carbonate of soda must be added, drop by drop, until the blue colour returns.

Gelatine Mountant :

Gelatine	4oz.
Water	16oz.
Glycerine	1oz.
Spirits of wine	5oz.

This mountant will keep good for about six months. To make it, swell and dissolve the gelatine in the water, then add the glycerine, and, lastly, the spirits. Upon adding the glycerine it will go into a thick lump ; this, however, will dissolve upon stirring.

To Bend Glass Tubing.—Place the part where the curve is required, in the flame of a spirit-lamp or in an ordinary gas flame (the whole of the surface must be equally heated) ; when the glass begins to soften, a gentle pressure by the hands will give the necessary bend.

Substitute for Ground-glass.—Lay the piece of glass to be ground flat on a table. Then sprinkle the finest emery over the surface and moisten it. Next take another small piece of glass, and by its means grind the glass smoothly and evenly till a uniform grain is apparent over the whole surface. The finer the emery used the finer will be the resulting grain.

Varnish to Imitate Ground-glass :

Sandarac	18 parts
Mastic	4 parts
Ether	200 parts
Benzole	80 to 100 parts

Water-tight Solution for Wooden Dishes :

Common brown resin	$\frac{1}{2}$ lb.
Beeswax	2oz.

Melt together in a tin pan (a preserved meat tin will do). When quite fluid, run the solution rapidly over where required. The wood must be perfectly dry.

French Measures :

1 gramme	. . . . .	= 15·432gr.
1 kilogramme	= 2·2lb., avoird.	(nearly) = 1000 grammes.
1 litre	. . . . .	= 35·216oz. (fluid)
1 cubic centimetre (c.c.)	. . . . .	= 17 minims (nearly)
50 cubic centimetres		= 1oz. 6dr. 5 minims

Approximate Fluid Measure :

1 minim	= 1 drop
1dr.	= 1 teaspoonful
2dr.	= 1 dessert-spoonful
4dr.	= 1 table-spoonful

To Cleanse the Hands from Silver and Iron Stains.—Dilute hydrochloric acid to half its strength—or, better still, chloride of lime in strong solution; pour $\frac{1}{2}$ oz. of this on the hands, and rub well in till the stains disappear. Next rinse the hands and apply a little dilute solution of potassium oxalate.

Titling Photographs.—Write on negative backwards with Indian ink, or print on a thin piece of paper with rather wet printer's ink, and rub it, face downwards, on the film-side of the negative before it gets perfectly dry.

To Give a Matt Surface to Silver Prints.—Mount the print in the ordinary way, avoiding lumps. Roll, and afterwards sift on the surface finely-ground pumice powder. With a circular motion rub gently with the palm of the hand. Proceed until the surface desired is obtained.

To Blacken Cameras.—A good dead black is made as follows: Mix drop black, ground in turps, with gold size and turps—enough gold size to keep the black from rubbing off when dry.

Backing Plates to Prevent Halation.—A solution of bitumen in coal-tar, naphtha, Brunswick black, or black varnish.

To Cleanse Bottles.—Put in a small quantity of strong hydrochloric acid, which will cleanse them instantly. Wash the bottles well afterwards.

A Simple Changing-bag.—Procure 2yds. of a fine, close, red Turkey twill, and make up into a bag, with a piece of strong elastic attached, just long enough to go round the waist. Put all you require into this: slide, box of plates, and box for exposed plates, then your head and arms, and “changing” will be thus rendered an easy task.

Tests.—Dr. Mason gave the following “tests” to the *Amateur Photographer*, in 1887, which are invaluable to the photographic student:

Test for Hard or Soft Water.—Dissolve a small quantity of good soap in alcohol. Let a few drops fall into a glass of water: if it turns milky, the water is hard; if not, it is soft.

Test for Earthy Matters or Alkali.—Take litmus-paper dipped in vinegar, and if on immersion the paper returns to its true shade, the water does not contain earthy matter or alkali: if a few drops of syrup be added to water containing an earthy matter, the water will turn green.

Test for Carbonic Acid.—Take equal parts water and clear lime water. If combined or free carbonic acid is present, a precipitate will be seen, and on a few drops of muriatic acid being added, effervescence will commence.

Test for Lime.—Put a few drops of a solution of oxalic acid into a glass of water, and blow upon it: if the water becomes milky, lime is present.

Test for Iron.—(1) Boil a little nutgall, and add to the water: if it turns grey or slaty, black iron is present. (2) Add a few drops of solution of prussiate of potash: if iron be present, the water will turn blue.

Test for Magnesia.—Boil the water to a twentieth part of its weight; add a few grains of neutral carbonate of ammonia and a few drops of solution of phosphate of soda: if magnesia be present, it will fall to the bottom.



CHAPTER XVII.

Cameras—Lenses—Shutters—Photographic Sundries.

Cameras.—In Chapter I. were given the essentials of a good camera. A few brief comments, however, on the specialities of some of the leading caterers for amateur photographers will be of service to the would-be purchaser. Of course, in the selection of a camera the choice depends in a great measure on the money at disposal for the purpose. It will be as well, perhaps, to deal with the cheaper “sets” first.

I am not acquainted with any firm that provide such cheap, serviceable, neat-looking, reliable cameras as Messrs. J. Lancaster and Sons, of Birmingham. This firm’s wares have met with unprecedented success. From all quarters amateurs sing their praises loudly; and, judging from the work effected by means of these economical instruments, their language is not that of exaggeration, but of strict, sober truth. The most popular camera the firm make goes by the name of the “Instantograph.” This year it has been greatly improved, and for lightness, portability, elegance, cheapness, and capability to do good work, is a veritable marvel. It possesses conical leather bellows, rising and falling front, lateral motion, swing back,

and special contrivance for extra extension when required. The lens supplied with this camera is of excellent quality, being capable of work of no mean order for portraiture, groups, instantaneous effects, and landscape, while the neat revolving shutter supplied with all Messrs. Lancaster's lenses is a marvel of compactness and reliability. Their "International" is a much stronger-made camera, with exceedingly long and extending bellows, rendering it extremely useful for copying purposes, or when using a lens of long focus. The best camera the firm make is known as "The 1888 Special Patent Camera," which is superior to the others in workmanship and finish, though it is very questionable whether practically it will turn out better pictures than the "Instantograph."

Of the more expensive cameras, that known as the "Middlemiss Patent," manufactured by Messrs. Marion and Co., is a splendid piece of apparatus, made of the very best material, and finished in the highest style of workmanship. It possesses conical leather bellows, capable of double extension, double swing back, reversing back, all front motions, with special brass supports, circular cut front for rapid changing of lenses, contrivance for folding, whilst on tripod, into marvellous small compass, besides special arrangements for two pictures on one plate. In addition to all these great advantages, the dark slide possesses a spring catch, locking the shutter firmly. The cameras of Messrs. Perken, Son, and Rayment are beautiful instruments. Their "Wide-angled Optimus" camera is a little gem for good workmanship and portability. It possesses long extension bellows, and at the same time affords facility for focussing when using a wide-angled lens, or one of extremely short focus.

If money be no consideration, it would be difficult to find a better camera than the "Thornton-Pickard," Ruby pattern, which possesses all the characteristics of an ideal instrument. It is fitted with a turntable, has a front with an unlimited amount of rise and fall, and possesses the further unique advantage of having the shutter permanently attached to the front of the camera. For touring purposes this camera is hardly to be surpassed.

At the present time there is a great rage for "detective" cameras. These novelties assume a very great variety of forms, and with some of the best of them many interesting "bits" may be secured which otherwise would be lost. Messrs. Lancaster and Sons manufacture one in the form of a watch, which can be carried conveniently in the waistcoat pocket. When closed it is exactly like an ordinary watch, and is opened instantly by pressing a spring, when a series of about half-a-dozen tubes immediately shoot out into position. Messrs. Marion and Co. sell one in the form of a small brown paper parcel, under the name of the "Parcel Detective." With this camera, all objects 6ft. or more distant are always in focus. The exposure is quite a simple matter, and the instrument takes full quarter-plate size. The best secret camera is, however, manufactured by the well-known opticians, Messrs. J. Robinson and Sons, of Regent Street. This camera is worn beneath the waistcoat, and entirely hidden from view, the lens protruding through one of the buttonholes. Six exposures may be made without the trouble of re-charging the camera. The dry plates to be used with this ingenious little instrument are round instead of oblong, and exposure is effected by simply pulling a small cord. Detection is almost impossible.

It has the further great advantage of being the cheapest of all the cameras of the detective order. There are also several other "detective" cameras of equally novel forms, such as the photographic gun of Messrs. Sands and Hunter; another has the appearance of a dressing-case, by Messrs. Newton and Co. but many of them are in reality nothing more than toys.

Lenses.—All Messrs. Lancaster's lenses are strongly to be recommended, and many of them are fitted with what are known as the "Iris" diaphragms, which are, in fact, revolving stops, a great convenience in the field, rendering loose stops (so liable to be missing when required) quite unnecessary. Their best lens is known by the name of the "Rectigraph," and is as good a doublet of the rapid rectilinear type as can be purchased. Everything, in fact, the firm manufacture may be thoroughly relied upon, both for cheapness and quality.

Another good photographic house which can be strongly recommended to the amateur is that of Messrs. Perken, Son, and Rayment (late Lejeune and Perken). The lenses sold by this firm, bearing respectively the names "Optimus" and "Euryscope," are extremely popular amongst amateurs, the work they are capable of performing in scientific hands being equal to that of lenses at three times the price. Lenses bearing the following names are also to be recommended: John Browning, Beck, Grubb, Suter, Newton, Voigtlander, Wray, and, of course, if price be no object, the world-renowned instruments of Dallmeyer and Ross.

Shutters.—For cheap, reliable shutters, the following may be strongly recommended: "The Economic"

(Perken, Son, and Rayment), "Cadett's Drop" (Marion and Co.), "Instantograph" (Lancaster and Sons), and Hulme's "Two-shilling Drop Shutter." In all the better-made shutters the exposure can be varied from the hundredth part of a second to nine or ten seconds. All the higher-priced shutters, too, are fitted with a pneumatic release, consisting of an india-rubber tube, with a hollow ball at one end, attached to a small piston. The pressure of the ball forces the air along the tube into the piston, causing a small piston-rod to protrude from the end, thus effecting the release of the shutter. By means of the "pneumatic release," the exposure can not only be unerringly made at the precise moment, but also without the fear of shaking the apparatus at the critical time.

The Thornton-Pickard Time Shutter is an instrument which every amateur photographer should possess. It can be used for either "instantaneous" or "time" exposures. In fact, when set for "time" exposures, it can be kept open as long as desired, and used instead of the cap of the lens. It is extremely light, portable, and free from vibration. At the price there is no shutter in the market to approach it.

The following shutters can also be strongly recommended: "The Kershaw Shutter" (Marion and Co.), "Ye Phantom" (Perken, Son, and Rayment), "The Evolute" (London Stereoscopic Co.), "The Phoenix" (Reynolds and Branson), Watson's "Double Snap," and "The Eclipse" (J. F. Shew and Co.).

Photographic Sundries.—To cyclists a portable tripod is a necessity. One of the most reliable and compact is the "Cyclist's Tripod," manufactured by Messrs. W. Watson and Sons. Each leg folds up into four parts. This tripod is exceedingly rigid when set up, although

it weighs under 2lb., and when closed is only 16in. in length. When unfolded it stands 52in. high, and will comfortably hold a camera whole-plate size.

To those who make a speciality of instantaneous work a "view-finder" of some sort or other becomes a necessity, in order to tell when the object desired to be photographed is in the ken of the lens. The one patented and sold by Messrs. H. Newton and Co. is as simple, convenient, and reliable as any in the market, being constructed on quite a new principle. It is so small that it can be easily carried in the waistcoat pocket, and it entirely dispenses with the use of a focussing-cloth, the reduced reproduction of the object being defined even in full sunlight. A further advantage is that the instrument is always in focus, rendering all adjustment unnecessary.

"Tylar's Metal Slides" are a great boon to the amateur. Three of these metal slides can be purchased for less than the price of one wooden one, but they are thoroughly reliable, neat, and serviceable for all that. The possession of three or four of these excellent dark slides entirely dispenses with the necessity of either a dark tent or a changing-box, both cumbersome pieces of apparatus, more nuisance and bother to the amateur than aught else.



CHAPTER XVIII.

Photographic Note-book—Photographic Clubs—Photographic Handbooks—What to Photograph—Concluding Remarks.

Photographic Note-book.—I cannot too strongly advise the amateur to keep a note-book, in which he can record everything falling under his eye which promises to be valuable. Not a thin little pocket-book, but a good thick volume. It is my invariable plan when “tackling” a new subject to commence a note-book of this description, and I have drawn considerably on one for many of the hints given in this work.

Of course it would be impossible to tender thanks to any particular photographer for hints thus taken and here given, as they could not be traced to their respective authors, having been collected from a thousand and one sources—cuttings from old and new photographic journals, hints dropped from the lips of photographic “lights” at conventions, formulæ from manufacturers and experts, valuable opinions and experience gleaned from the letters of enthusiastic correspondents, as well as from the discussion pages of the manuscript journals of various postal photographic clubs. All this is mentioned as a hint to the reader.

A copious note-book is invaluable to the painstaking student of any subject. To the photographer who wishes to excel in his work it is indispensable. Therefore record, clip, copy odds and ends from all imaginable sources, and thus lay up a storehouse of information. No one manual can teach you all that is to be learned. Roam from manual to manual, from article to article, from journal to journal, picking up a little knowledge here and a few valuable hints there. When a good quantity of material is collected, arrange it, classify it, and, above all, digest it. Test the accuracy of every statement jotted down, and when "proven" tell your fellow-photographers of your "find."

Photographic Clubs.—Join, if possible, one of the valuable photographic clubs which are to be found in almost every town of any importance. This you will find a very great help, as you cannot individually test all the new formulæ promulgated, or try all the new printing processes; but at a club meeting all contribute their quota, and thus you can learn much from the varied experience of others. There, too, you will be able to see most of the well-known cameras in the market, hear their respective owners' criticisms, and gather quite a host of valuable opinions as to the quality of the endless array of lenses and shutters of all the best manufacturers, the faults or virtues of the various plates, and the *modus operandi* of all the latest processes.

If you live in the country join a postal photographic club, which possesses almost equal advantages to a town club. Someone asks: "What is a postal photographic club? How can I join one? What is the expense of membership? How is such a club worked?"

I will briefly answer these few questions. The expense is a trifling matter, being a mere question of posting the monthly album, with the addition of a nominal subscription to the club to defray petty secretarial expenses. Often there is some little difficulty in securing a place on the postal list of a good club. If this cannot be effected, start a club of your own. Never mind your photographic experience being limited. All you will be responsible for will be the selection of the members, the management and working of the album, and the necessary secretarial work of the club.

Someone asks: "How must I set about it?" Well, in the first place, write to the editor of one of the photographic journals, or to *The Bazaar*, *Exchange and Mart* newspaper, to the effect that you are desirous of starting a postal photographic club, and anxious to receive the names and addresses of would-be members. A letter of this character is sure to evoke a sufficient number of likely names.

Next decide whether the club shall consist of members whose knowledge of photography is elementary or advanced. It is the wisest plan, perhaps, to select members of various degrees of proficiency, so that the advanced section may hold out a helping hand to the beginners. At the same time there must not be too great a gulf between the work of the members, or else one portion of the club will have all the advantages and the other all the disadvantages.

Ten members is a good number to start with. These having been secured, draw up a simple code of rules; and when complete see that every member observes them. If once the rules of the club are ignored, no end of trouble and annoyance will follow. Elaborate rules are an abomination. All that is required is:

(1) title of club, (2) conditions of membership, (3) number of photos each member is expected to insert monthly, (4) length of time each member is entitled to keep the club's album, followed by a list of fines for omission of any of the above, which should be strictly enforced, the total amount at the end of the year going towards a prize to be given to the most diligent member of the club. The photos travel best in a light wooden box, which it is advisable to have covered with leather, so as to escape damage in its many journeys through the post.

A good-sized copy-book should accompany the photographs. In this neatly inscribe the title of the club, together with rules, notices, names, and full postal addresses of the members, leaving sufficient space for "Remarks by Members," "Discussions" on previously announced subjects, "Time Table," "Suggestions," "Queries and Answers," &c. Each member should insert at least two mounted cabinets monthly, fullest particulars of each being given as to (1) exposure, (2) lens, (3) stop, (4) light, (5) time of day and year, &c. Each member, too, should be earnestly requested by the conductor to criticise the work of the rest of the members, and the members so criticised should receive all remarks with good grace, even though adverse. If the members are not permitted to speak their minds, the club develops into a mutual flattery society. On the return of the album, each member takes out his old photos and substitutes fresh ones.

There are other lines on which postal photographic clubs are worked, but none, in the writer's opinion, more satisfactory than those given above. Of course, the secretary of a club can alter the rules and working details to his own satisfaction.

Photographic Handbooks.—The following can be recommended: "Practical Guide to Photography," 2s. 6d. (Marion and Co.); "Art of Retouching," 2s. (Marion and Co.); "The Photographer's Indispensable Handbook," 2s. 6d. (Iliffe and Sons); "Beginner's Guide to Photography," 6d. (Perken, Son, and Rayment); "Instruction in Photography," 3s. 6d., by Captain Abney; Platt's "Table of Exposure," 1s.; "Art and Practice of Silver Printing," by Robinson and Abney, 2s. 6d.; "Pictorial Effect in Photography," by H. P. Robinson, 2s. 6d.; "Picture-making by Photography," by H. P. Robinson, 2s. 6d.; "The Studio, and What to Do in It," by H. P. Robinson, 2s. 6d.; Burton's "Modern Photography," 1s.; "Amateur's First Handbook," by J. H. T. Ellerbeck, 1s.; "Sanitary Hints to Photographers," by Dr. Henry Nepais, 2d.; "On the Choice and Use of Photographic Lenses, by Dallmeyer, 1s.

What to Photograph.—When a leading member of an important county photographic society lately uttered the dictum that landscape was the domain of work proper to amateurs, and that figures should be left to professionals, I hope he was influenced by the consideration that much harm can be done to professional men by undue production of the class of figures we know as portraiture. It would be beside my present object to show how this acts; my aim is merely to point out, not only the pleasure, but as a matter of art-training the profit, of figure studies, so-called.

Landscape undoubtedly has its charms, and these are increased when the photographer secures scenes that have given him pleasure, and that will remind him of cherished places when away from them. Yet as pictures these would be improved by figures judiciously introduced. The mere portrayal of such a landscape as can

be got out of photography—that is, without colour and generally without atmosphere—is a tame thing. Unless the painter went far beyond this, and got feeling into his work by the growing crop, or the gathering of it by the labourers who work on the farm, in their going or returning and in their occupation, by which they give life to a landscape, his work would be lightly esteemed indeed. It is discounted now, and comparatively few men rise to distinction who follow landscape pure and simple. Whatever else a photographer may do, I recommend to any amateur possessing taste, and some idea of composition, the study of figures. Of portraiture? No! Figure subjects in which likeness can be entirely disregarded—in which a figure without a face, as it were, can occasionally be made to play a leading part. Let little dramas and comedies of life be reproduced by means of the camera. Make models act—not constrainedly, but as they would do a thing that fell to their ordinary lot to do. Make them *think*—not appear as if thinking somewhat, but actually thinking—and give them a subject to think about. Compose episodes, and in doing so for the camera think out the things that daily occur. Take any human being; consider what occurs to him in his work, his leisure, his pleasures, his pains; consider which of these would by portrayal give a picture. Decide thoroughly how it should be done; who would be required to complete the subject; get the right person to play a particular part, if one be wanted; and then, when all conditions seem complete, produce the picture.

To-day extremely rapid plates, of very reasonable price, single lenses of narrow angle and long focus, make figure-work of this description most easy, and it will be

found extremely interesting. Until they have tried let none say they cannot do it. Begin with a single figure—a knitter—a smoker—a school-girl doing anything—a school-boy with a kite, with marbles, with a hoop, with a top, with a book—anything natural. Subjects abound on all hands—so do models—only eyes are wanted to detect them. Remember, the first and last of all this is, whatever is essayed must be natural and true, or failure ensues. Persevere; be original; and your pictures will please.

Concluding Remarks.—At last my task is completed, and I have now reluctantly to bid my readers farewell. Many side departments of the art of picture-making have of necessity been left untouched, as my aim has simply been to give a helping hand to those about to commence photography, yet who were entirely in ignorance as to the necessary manipulations. It is sincerely to be hoped that what has been an exceedingly pleasant task to me may not have been without help to some beginners in the fascinating art.

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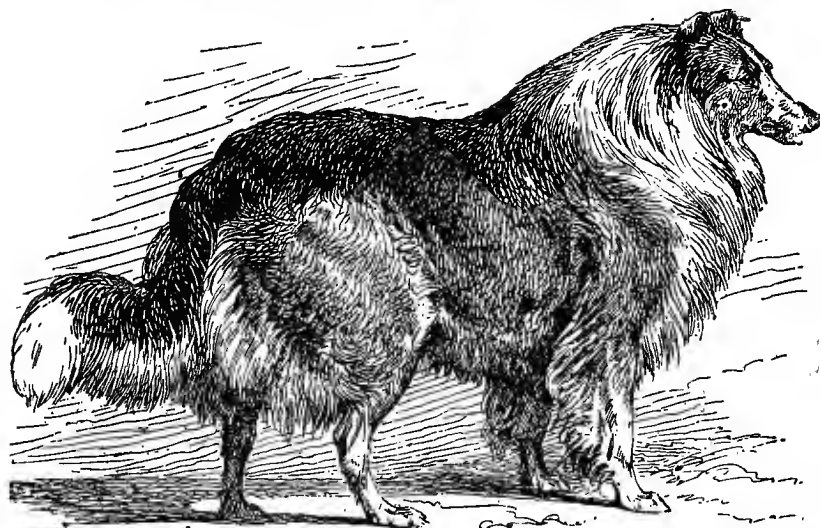
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